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MEDICAL RESEARCH: THE STORY OF SULFANILAMIDE

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A School of Medicine has primarily two objectives: the training of future physicians and the advancement of knowledge by medical research. For the attainment of the first, the second, properly pursued, is necessary; and the two, wisely combined, may produce what the distinguished Dean of this School of Medicine recently described as "the biologically minded physician". Organized medical research, at least in the so-called pre-clinical subjects, is a recent innovation. With the partial exception of the anatomical laboratory, laboratories in medical schools for the training of students and for research are largely creations of the last three-quarters of a century. Except in two or three instances, all of the physiological laboratories worthy of the name have been established since the middle of the past century; the first pathological laboratory was founded by Virchow in Berlin in 1856; physiological chemistry as a separate discipline split off from physiology quite late, and Hoppe-Seyler headed the first independent laboratory devoted to this subject at Strassburg in 1872; pharmacology as the experimental science we now know began when Buchheim established its first laboratory in his private house at Dorpat in 1849. Coincident with the growth of organized laboratories for medical research, the whole face of medicine has changed, and it is probably no exaggeration to say that a greater advance has been made in the art and science of medicine in this 75-year period of laboratories than in all previous medical history put together.

Address delivered at the dedication of the new Medical and Public Health building of the University of North Carolina, *Sesqui-Centennial Celebration, December 4, 1939.*

Many of you who are not students of the medical sciences are but little interested in medical research and theories of disease. When illness overtakes you, you wish to be cured "safely, quickly and pleasantly". I doubt if physicians can carry out this ideal treatment at present, but the lot of the diseased person today is so immeasurably improved over what it was a hundred years ago that another century may indeed see doctors curing their patients "safely, quickly and pleasantly". This improvement has all come about as a result of the labors of thousands of unknown workers at medical research—some in remote and isolated places—during the past century.

A decade ago, the British Government had occasion to find a formula for delimiting the field of medicine, and adopted the following:

"Medical research deals by no means only with the cure of disease. It deals with the proper development and right use of the human body in all conditions of activity and environment, as well as with its protection from disease and accident, and its repair." This marks out a vast territory wherein lies the whole business of human life on this earth, in all its ramifications from the cradle to the grave. Before the medical research student stands, directly or indirectly, the challenge of the prevention, alleviation and cure of human diseases. The lessons of science show clearly, however, that the investigator having a definite practical goal in view frequently defeats his own ends by his impatience of any but the paths that seem direct and obvious. The cure of disease can only be effective in so far as knowledge guides it, and important discoveries come

generally from the work of those who seek knowledge for its own sake. The man into whose lap the ripe fruit of discovery falls, when the time is propitious, has builded on and profited from countless pieces of research and the long labors of a host of other investigators.

This point of the pursuit of medical research for its own sake, of allowing the investigator to attempt to answer questions in a desire only to satisfy his own curiosity, seems to me to be important in this day and age of practical things. Last year at the opening of The Squibb Institute for Medical Research, Mr. Abraham Flexner gave an address on "The Usefulness of Useless Knowledge" in which he stressed this point. May I quote two sentences:

"The men and women who are today making the largest contribution to human happiness and human health are the quiet workers in laboratories and libraries and who in the pursuit of a devoted career do not pause to ask themselves 'What is the use?'."

"Throughout the whole history of science most of the really great discoveries which had ultimately proved to be beneficial to mankind had been made by men and women who were driven, not by the desire to be useful, but merely by the desire to satisfy their curiosity." The waste in such a program seems enormous, but it is not really so. No one can tell when knowledge acquired by an investigator satisfying his intellectual curiosity in a field of medical research apparently quite remote from practical things may be vital to the health of mankind. No matter how remote and isolated, real research is the life blood of a living medical school.

Permit me to pass now from these general remarks and tell a story of recent medical research which will, I hope, emphasize the importance of such research and illustrate some of the above points. You all know from your reading of newspapers and magazines that in the past three years, a new drug—sulfanilamide—has been used for the treatment of serious bacterial infections. I wonder, however, if all of you realize that the introduction and use of this drug marks, in the opinion of many observers, a period really "epochal in the history of medicine". Personally, I should consider its introduction into medicine as an event to be ranked with the two really great therapeutic discoveries of all medicine—the discovery of anesthesia and that of antiseptic (or aseptic) surgery.

Let me try to relate briefly the story of sulfanilamide; it is absorbing. We must start way back in the year 1904, when Ehrlich and Shiga first showed that a fatal experimental infection of mice caused by a protozoan—a trypanosome—could be completely cured by a single injection of a relatively harmless red dye. Regardless of the fact that other species of infected animals did not respond like mice and that these experiments were of no immediate practical value, a real advance had been made in proving for the first time that a hitherto invariably fatal infection could be cured by a chemical agent. As you all know, six years later Ehrlich announced the discovery of the organic arsenical—Salvarsan—as a cure for syphilis. However, despite the advances which have been made by medical researchers since Ehrlich's time in the chemotherapy of protozoan infections, nothing of any practical importance was developed in the chemotherapy of bacterial infections until within the last three or four years, when drugs containing the sulfonamide group were introduced. This failure was not due to the lack of research along these lines, but probably to the fact that such investigation is still in the stage of haphazard trial and error. As far back, however, as 1911, Morgenroth and Levy had found that a chemical substance related to quinine—ethylhydrocuprein—would cure pneumococcus septicemia in mice; the only instance until a few years ago of the cure of an experimental bacterial infection by a drug. The curative dose was very near the lethal one, however, and this remedy when tried in pneumonia in man was found too toxic to be given in sufficient dosage for effective therapy.

Three years before Morgenroth and Levy's work, in 1908, the chemical compound sulfanilamide was prepared by a chemist, Gelmo, working at the Royal Technical *Hochschule* of Vienna, apparently with the sole desire to satisfy his curiosity. A year later chemists of the I. G. Farbenindustrie at Elberfeld, Germany, prepared azo dyes with sulfonamide and substituted sulfonamide groups and found that they were distinguished by greater fastness to washing and milling than the corresponding sulfonamide-free products. As far as is known no attempt was made at this time to apply these com-

pounds to the control of bacterial infections. As the result of a series of investigations in the laboratories of the I. G. Farbenindustrie, Domagk announced in 1935 that an azo dye containing the sulfonamide group prepared by Mietsch and Klarer would cure an otherwise fatal streptococcus infection in mice. This compound was called Prontosil. Clinical reports attesting to the efficacy of Prontosil in patients with streptococcal infections appeared shortly before and at the same time as Domagk's announcement of his discovery. Workers at the Pasteur Institute late in 1935 suggested that Prontosil was broken down in the body to form sulfanilamide, which was found to be equally as effective as Prontosil. This observation was of great importance, as it demonstrated that a relatively simple organic compound was effective as a chemotherapeutic agent in streptococcus infections.

English investigators in 1936 confirmed, as Long and Bliss did later in America, the fact that both Prontosil and sulfanilamide would cure an otherwise fatal streptococcus infection in mice. In spite of numerous reports from abroad, dating from 1933, on the effect of these drugs in bacterial infections in human beings, it was only with the publication of a paper in June, 1936, by Colebrook and Kenny of Queen Charlotte Square Hospital in London on the remarkable results in child-bed fever that much interest was awakened in English-speaking countries in the new drugs. Investigation of all phases of the new drugs has been increasing at an accelerating rate since this time.

Nearly all of the studies with sulfanilamide (and allied drugs) on experimental bacterial infections have been made on mice. Although supposed at first to be specific against hemolytic streptococcus infection, sulfanilamide (or allied drugs) has now been shown to be curative in experimental mouse infections due to meningococcus, gonococcus, E. typhi and paratyphi B., Clostridium Welchii, some strains of dysentery bacillus and a staphylococcus. Temporary protection only, with delay of death but no recovery, was found for mice infected with S. aertrycke, Frielander's bacillus, P. pseudotuberculosis, and P. septica. Against pneumococcus infections in mice, sulfanilamide is much less effective than it is against streptococcus infection. In regard to other bacterial infections against which sulfanilamide appears to exert a beneficial effect, mention must be made of its inhibitory effect on experimental tuberculosis in the guinea pig, of its remarkable curative effect in certain human urinary tract infections, and of the suggestive results obtained in the treatment of Brucella infections in animals and man. Against infections caused by protozoa as opposed to bacteria, it has been shown that this drug is ineffective in rabbit syphilis, trypanosome infections in mice, and malarial infection in birds. However, it has been found to cure acute malarial infections in monkeys. Against virus infections, sulfanilamide and allied drugs have been generally found to be ineffective, although certain favorable results which have been reported justify further investigations in this field.

Just what do we mean when we say that sulfanilamide cures an otherwise fatal infection in mice? Let me briefly describe an experiment. One hundred mice are given an infection of 200-300 lethal doses of a culture of streptococci. Fifty are placed on finely ground food containing one-half of 1 per cent sulfanilamide, while the other group of fifty are given the same food without sulfanilamide. In twenty-four hours, many of the untreated mice are dead, and the others appear very sick; in forty-eight hours all the untreated mice have died. The mice which have received sulfanilamide look healthy and cannot be told from normal uninfected mice. After three days, treatment is stopped and observation shows that all the treated mice survive. If a much smaller percentage of sulfanilamide is used in the food, a few treated mice may die during the three days of treatment, and many will die later, only a few surviving.

That sulfanilamide is a specific cure in certain infectious diseases in human beings has now been proven by incontrovertible evidence. Streptococcus meningitis, an inflammation of certain lining membranes of the brain, is almost invariably fatal, giving a death rate under all other forms of treatment of over 97 per cent. Enough cases have now been treated with sulfanilamide to show conclusively that the death rate can be reduced to something below 35 per cent; with prompt recognition of the disease and treatment the death rate may be made negligible. In French Nigeria a year or two ago a violent epidemic of meningococcus meningitis occurred. There was not sufficient sul-

fanilamide available for the French physicians to treat all patients. In those who were not treated with sulfanilamide there was a mortality of 74.6 per cent, whereas in several hundred cases treated with sulfanilamide the mortality was only 10.7 per cent. This kind of evidence, taken together with the numerous other clinical cases of streptococcus infections in which sulfanilamide has been used, shows conclusively that it has a great life-saving value. Besides meningitis, streptococcal infections causing erysipelas, cellulitis, middle ear disease, pneumonia and empyema, septicemia, child-bed fever, and osteomyelitis have been found to be favorably influenced by sulfanilamide. Sore throat, scarlet fever and sinusitis caused by streptococcus have been treated, but results are less certain than in the above diseases. Infections caused by meningococcus, gonococcus (gonorrhea and gonorrheal arthritis), gas bacillus, as well as various urinary tract infections, chancroid, trachoma and lymphopathia venereum, appear to respond very favorably to treatment with this drug. Pneumonia caused by the pneumococcus does not respond as do streptococcal infections. The effect of the drug is fair in undulant fever, and very questionable in typhoid fever and staphylococcal infection, while it appears certain that the common cold is not influenced.

Sulfanilamide has been found from experiments on animals to be a relatively nontoxic drug. However, large doses cause symptoms resembling those seen in poisoning with ethyl alcohol and indicating that the central nervous system is mainly affected.

Although sulfanilamide is a drug possessing remarkable therapeutic properties, it produces at the same time in the human subject a wide range of toxic effects, some of which are minor and of no importance, while others are severe enough to endanger the life of the patient. Of the minor toxic reactions may be mentioned those referable to the central nervous system — dizziness, sometimes severe enough to resemble alcoholic intoxication, headache, nausea, indefinite malaise, cyanosis and acidosis. Symptoms of more importance are fever, skin rashes, and occasionally hepatitis, agranulocytosis, and acute hemolytic anemia. It should not be used indiscriminately, but only in those diseases where sound experimental or clinical research has demonstrated its value, as its administration may be attended with potential danger to the patient. Careful supervision of a patient taking sulfanilamide should reduce to a minimum the danger of its administration.

The drug is readily absorbed and passes into the blood and tissues when given by mouth. It is eliminated from the body in the urine, partly in unchanged form and partly as a conjugated derivative with acetic acid formed in the liver (this acetyl derivative is inactive therapeutically). The drug penetrates all fluids and tissues of the body and is present in these, with the exception of bone and fat, in about the same amount as in blood. This rapid diffusion and penetration of the drug to all parts of the body is undoubtedly one of the factors which make it a successful chemotherapeutic agent.

Numerous drugs allied to sulfanilamide have been tried experimentally and clinically. None of these appear to be as good or better than sulfanilamide, with the exception of sulfapyridine. This drug has proven about as effective in pneumococcus pneumonia and meningitis as is sulfanilamide in hemolytic streptococcus infections. It is also the most efficient drug known at present for staphylococcal infections.

What I have said above about the effect of sulfapyridine in pneumococcal infections does not begin to do justice to the miraculous effects of the drug. The serum treatment of pneumonia which has been in use for many years past has proven very effective, but it is limited in its use and is extremely expensive to give. Sulfapyridine has a much wider application. Statistical results have been accumulated during the past year in sufficient numbers to demonstrate its value beyond question, but one who has seen pneumonia patients treated with this drug does not need statistics to be convinced of its value. I can recall clearly one of the first cases which was treated with the sodium salt of sulfapyridine, and the dramatic results obtained. A woman of sixty-two years was seriously ill with pneumonia and at a stage where competent clinicians felt that death was only a matter of hours. Two intravenous injections of the sodium salt of sulfapyridine were given. The next morning the patient's temperature was normal and she appeared well. This sharp fall of temperature in a

patient seriously ill, frequently occurring in twenty-four hours after the administration of sulfapyridine and accompanied by signs that a very sick individual has become a well one, is one of the dramatic results of modern medicine. Sulfapyridine can be given by mouth just like sulfanilamide, and it is only in emergencies that intravenous injection of the sodium salt is indicated. On the whole sulfapyridine appears to be more toxic than sulfanilamide. As compared with sulfanilamide it has many disadvantages, but is the drug of choice at present for use in pneumococcus infections, although my own feeling is that it is by no means the final answer to the problem of the chemotherapy of pneumonia.

No satisfactory explanation of the mode of action of sulfanilamide in curing bacterial infections has as yet been attained. In a consideration of this problem three factors are involved: the drug, the infecting organism, and the host. The first step in any explanation is to decide to what extent the reaction between drug and bacteria is sufficient and to what extent the defense mechanism of the host plays a role in changing the drug or in removing the organism. At present, the balance of evidence would seem to indicate that sulfanilamide affects the invading bacteria in the sense of exerting a bacteriostatic or bactericidal action which is not sufficient to effect sterilization without the cooperation of the defense mechanism of the host.

This question of the mechanism of action of these new drugs is a very important one. If it could be solved the search for new drugs better than those we already have for treating certain infections and also for drugs to control infections not susceptible to treatment would be put on a firm scientific basis, independent of the more or less haphazard methods used at present. This is where medical research in its broadest sense comes in. One needs all the information possible about the chemical behavior of these drugs, about their effect upon the normal and abnormal human organism, about their effect upon different bacteria under various conditions, as well as information about the response of different strains or groups of bacteria of the same genera and detailed information about the intimate metabolic habits of various bacteria. Here research, no matter how remote and isolated, will be needed to fill in and complete the picture and enable us to use these new weapons against infectious diseases with the full knowledge which should be necessary for their truly scientific and intelligent use.

In conclusion, may I express the hope that the use of this fine new building which is being dedicated today may stimulate and expand the medical research with which the name of the Medical School of the University of North Carolina has always been associated.

URGENT SURGERY UPON INFANTS UNDER ONE YEAR OF AGE

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By the term "urgent surgery" I refer to those cases which are ordinarily called emergency, and also that group demanding imperative surgery in which a little more time, possibly two or three days, may be used for study and preparation.

Anatomically, an infant is a miniature adult, but physiologically and surgically such is not the case. He who operates upon one of these little ones without taking that fact into consideration is subjecting his patient to greater unnecessary risk than he who operates upon the goiter of a patient with acute hyperthyroidism without any more preparation or safeguard than is given to one with a simple non-toxic goiter. Mature judgment, experience in surgical technique, and speed without haste are probably more essential to success in surgery upon infants than in any other field of surgery.

The occasional operator should not attempt major surgery upon infants. The advice of a pediatrician or an internist especially interested in pediatrics is indispensable. It has been my custom, whenever possible, to place the major responsibility upon the pediatrician up to the time the infant comes to the operating room and again from the moment he leaves the table. During the pre-operative and post-operative periods, should there be a difference of opinion between the pediatrician and the surgeon, the opinion of the former should take precedence.

Among the important pre-operative measures to be stressed is restoration of water balance by mouth, by hypodermoclysis, or by intraperitoneal or intravenous infusions,

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using plain water, salt and glucose solution, or blood as indicated. Rapid dehydration and loss of weight from vomiting occur so commonly that its correction is probably the most important pre-operative indication. Where there is no vomiting or other contra-indication to food, nursing may be continued to within four hours of the operation. Morphia is contraindicated before operation, but small doses of atropine are usually, but not routinely, given.

Local anesthesia or ether by the open drop method have been most satisfactory to me. The occasional anesthetist, like the occasional operator, has no place in the handling of these desperately ill infants, unless a trained anesthetist is not available. Too frequently on the table a patient is allowed to become chilled from insufficient covering or from a cool operating room, or is loaded down with blankets so that there is an enormous loss of fluids from perspiration. While this is harmful to an adult, it may be disastrous to an infant.

Gentleness and precision, desirable in any class of surgery, are almost a *sine qua non* in dealing with these frail creatures. Rough and ready surgery has no place here. The necessity for careful hemostasis and for the use of very fine ligatures and sutures is obvious. Following operation, the preservation of water balance, prevention of acidosis, careful maintenance of the body temperature, and relief of distention are of such vital importance as to demand the closest attention of the surgeon or pediatrician, and should not be left to a nurse, regardless of her competence. Needless to say, the utmost care must be used to prevent infection, and should it occur, to detect and treat it in its incipiency. Infants react poorly to pyogenic infections. One day's absorption from a pyogenic infection in an infant may prove more harmful than three days' absorption of a similar infection in an adult.

In the brief time allotted me I will simply cite a few case histories illustrative of the conditions which I wish to discuss. Surgery of the ear, nose and throat will not be included, as my experience in those fields has been extremely limited.

Intussusception

Baby K., age three months, male, was admitted with the history that he had been vomiting for about thirty hours and had apparently severe pain in the abdomen. The mother stated that the abdomen had been greatly swollen for at least twenty-four hours, and that the baby had been passing blood. Examination showed temperature 101.5 (rectal), pulse 128, respiration 34. Heart and lungs were normal. The abdomen was markedly distended, and just to the right of the umbilicus a fullness could be seen, and a mass the size of a lemon could be felt. The mass was hard and appeared fixed. On rectal examination it could be felt, and when the finger was withdrawn there was a slight blood-tinged discharge. Under ether by the open drop method a right rectus incision was made. The ileum was found invaginated into the transverse colon, and was very edematous. The first part of the reduction was easy, but it was with considerable difficulty that the last few inches were reduced. The patient left the hospital in one week apparently well.

Baby F., age seven months, male, was admitted with the history that he had been having abdominal pain for thirty-six hours. The mother stated that she had given cathartics, but had been unable to get a movement from the bowel except blood. Temperature was 104.4 (rectal), the pulse was so rapid as to be recorded with a (?), respiration was 60. The patient appeared actually to be moribund. The abdomen was so greatly distended and rigid that it was impossible to say whether or not there was a mass. Our first reaction was that it would be useless to operate and that to do so would tend to bring surgery into disrepute. However, after two hours' preparation, during which we partly restored the water balance and lessened the acidosis, the baby seemed so much better that we decided to operate. A high mid-line incision was made, and the ileum was found invaginated into the descending colon. By gentle pressure it was easily reduced. The abdomen was filled with salt solution and rapidly closed. The patient was on the table twenty minutes. He made an uneventful recovery and left the hospital in nine days.

This case is cited not to advertise the skill of the surgeon but to emphasize how desperately ill these little ones can become in a short time, and yet respond rapidly to proper treatment. A seven months old baby, ill for thirty-six hours, abused with cathartics, dehydrated from loss of water and blood, was apparently so near gone that the wisdom of

operating was doubtful. Yet after two hours of preparation he was able to withstand a general anesthetic and an abdominal operation and to make a complete recovery.

Intussusception is probably the most frequent surgical catastrophe in the abdomen of an infant. At least two-thirds of all cases occur under one year of age, and the majority occur from about the fifth to the eighth month. It is several times more frequent in the male, and often seems to appear out of a clear sky in apparently healthy babies. There are several varieties, but the most common is the invagination of the ileum, cecum and appendix into the large bowel. The attacks usually appear suddenly and are manifested by severe abdominal pain. In fact the pain is so clear-cut, sudden, and acute, that it has been compared to the onset of a ruptured ectopic pregnancy. The pain passes off quickly and the baby appears to be comfortable. Soon, however, the pain recurs followed by vomiting, distention and tenesmus. Usually, but not always, blood is mixed with the stools, but later there is only a blood-stained mucous discharge from the bowel. Diagnosis can be made almost from the history alone, even when there is no bleeding from the bowel. Usually an abdominal tumor soon appears on the right side, in the center, or even on the extreme left. The finger in the rectum may palpate a mass, but often when no mass is felt and even when there has been no previous bleeding from the bowels, there will be blood on the finger when it is withdrawn. In the rare case when a definite diagnosis of intussusception cannot be made, it is nevertheless evident that an acute surgical condition exists which demands operation. Unfortunately, in the vast majority of cases, when first seen by the surgeon, the obstruction is well advanced and the diagnosis only too obvious.

In former years efforts were made to reduce the obstruction by fluids introduced into the rectum. This I mention only to condemn. It is too uncertain, wastes valuable time and adds to the shock. The x-ray is unnecessary. At operation, reduction is usually easy if the case is gotten within the first eighteen hours. In the late cases reduction down to the last few inches is seldom difficult, but complete reduction by manipulation alone is sometimes impossible. To leave the obstruction incompletely reduced is dangerous. To resect is almost invariably fatal. Probably the best solution is to incise the constricting band vertically just as you would cut the muscle of the pylorus in congenital stenosis, except that in these cases you cut completely into the lumen of the bowel, reduce the obstruction and then suture the incision in the gut with the finest silk and close the abdomen without drainage. That procedure is not as difficult or dangerous as it may seem, and has served me well in several cases.

As a rule acute intussusception once reduced does not recur. However, I recall one case in which I reduced by operation a simple intussusception in a baby eight months old. Less than a year later, while I was out of town, the intussusception recurred and another surgeon operated. About six months later it again recurred, and then at operation I tacked the terminal ileum to the side of the cecum. The patient is now over twenty years old and has had no further trouble. I mention this case merely as a matter of interest, and not to recommend that the ileum be fixed by suture routinely.

Meckel's Diverticulum

Baby B., age three months, female, was admitted to the hospital with the history that twenty-four hours previously she developed severe abdominal pain which would come and go, accompanied by marked vomiting. These symptoms increased in severity up to the time of admission. The mother stated that the abdomen was greatly swollen and that there had been neither diarrhea or marked constipation. The temperature was 102°, pulse 120, respiration 30. Lungs were clear and heart normal except for the rapidity. The abdomen was uniformly and greatly distended—the typical drum-like appearance. It did not seem to be especially tender. No mass was felt on abdominal or rectal examination. A right rectus incision was made. The appendix was normal. A Meckel's diverticulum was found pressing on and constricting a loop of the small bowel. The diverticulum was removed almost flush with the ileum, and the opening in the intestine sutured longitudinally with a fine silk suture. The patient made an uneventful recovery and left the hospital in one week.

Statistics from autopsies indicate that Meckel's diverticulum occurs in possibly 3 per cent of individuals, yet I have heard surgeons of large experience state that they

rarely see one. The late Sir William Osler was in the habit of asking his students why it was that so frequently a physician in practice would state that he seldom saw such and such a sign in such and such a disease, when the text-books stated it was quite common. After the students had made several unsuccessful stabs at a reply, Dr. Osler would answer, "It is because it was not looked for carefully." Obviously I do not recommend routine search for a Meckel's diverticulum when the abdomen of an infant is opened for some other cause. However, I do recommend it as a routine procedure in adults when feasible, and it is surprising how many times the search will be rewarded.

Congenital Bands

Baby F., age five weeks, male, was seen at his home by a very competent physician shortly after the onset of vomiting. Following consultation with a pediatrician the baby was brought at once to the hospital with a diagnosis of "something gone wrong in the abdomen which demands a surgeon". A midline incision revealed a loop of ileum bound down tightly by a band arising from the cecum and extending to the parietal peritoneum. This band was severed and the bowel found to be in good condition. Recovery was uneventful.

Strictures causing partial or complete obstruction, blind pouches and other congenital abnormalities of the small bowel, while not frequent, may occur in the practice of any surgeon. Usually they become manifest in the first few weeks of life. Rarely is the correct diagnosis made, nor is that necessary, providing the need for exploration is recognized promptly.

Congenital Pyloric Stenosis

Baby A. B., age seven weeks, female, admitted to the hospital with a history of vomiting and loss of weight. The presence of a typical olive-shaped mass in the region of the pylorus gave the diagnosis. After the usual examination and pre-operative preparation by a pediatrician, a high right rectus incision was made under ether. The liver was retracted. A Fredet-Rammstedt operation was performed. The patient left the table in good condition and was returned to the pediatrician for post-operative care. She made an uneventful recovery.

Baby F. P., age three weeks, female, was admitted to the hospital from a neighboring town in an extremely emaciated condition. The history was that various forms of nourishment had been tried which merely increased the vomiting. The true diagnosis had not been suspected, although when the patient was admitted to the hospital, a small mass could be felt just below the right costal margin near the mid-line. Under the care of a pediatrician the baby improved rapidly, so that in about thirty-six hours operation was advised. Because the baby was improving under treatment, the parents felt that operation was unnecessary and took her home to continue the treatment. About ten days later she was brought back in a worse condition than at her previous admission. Again the pediatrician attempted to get her in shape for operation, but with only fair success. Under local anesthesia a high right rectus incision was made, the liver retracted and the stomach found to be tremendously dilated. A Fredet-Rammstedt operation was done with excellent exposure of the mucosa. A few whiffs of ether was then given to facilitate closure. The patient left the table in fair condition but died forty-eight hours later.

These two cases are cited for comparison. In the former the diagnosis was made promptly, and after the usual preliminary preparation a successful operation was performed with very little danger. In the latter the baby was not brought to the hospital until she was extremely emaciated and dehydrated. Even when the condition was improved to the point where operation seemed justified it was refused.

The cases of simple pylorospasm recover under medical treatment, while in the cases of true stenosis attempted relief by medical means causes a loss of valuable time. Until recently some pediatricians believed that since the medical treatment, consisting largely of gastric lavage followed by feedings through the catheter, together with atropine or phenobarbital, would cure simple pylorospasm, it would also cure or relieve some of the cases of true stenosis. Most pediatricians now agree that when simple pylorospasm has been ruled out, and a definite diagnosis of true obstruction made, operation should be resorted to after proper preparation. Therefore the important point is the differentiation between the two conditions. In both there is projectile vomiting with definite peristaltic waves visible over the epigas-

trium; although in the true stenosis the amount of vomitus is somewhat more and the peristalsis more active. However, the difference in degree of those two symptoms is not sufficient to be relied on entirely in differential diagnosis.

In pylorospasm there is only slight loss of weight, while in true obstruction the loss is usually marked. In pylorospasm the stools are practically normal, while in true pyloric obstruction they are scanty and composed largely of mucus. In pylorospasm obviously no tumor can be felt, while in true obstruction a tumor can usually be felt, and if so, is pathognomonic. Usually the diagnosis of congenital pyloric stenosis can be made without the x-ray. If there be doubt, x-ray is helpful by showing the contrast medium present in the stomach after six to eight hours in the true obstructive cases in spite of vomiting, whereas in that length of time the stomach will be empty if there be no organic obstruction. Needless to say the stomach should be washed out immediately prior to operation.

Acute Appendicitis

Although acute appendicitis is seen frequently in children under three years of age, I have seen no case under one year.

Imperforate Anus and Rectum

The records of the out-patient department of the New York Lying In Hospital showed that imperforate anus occurred 27 times in 93,000 births, or one in 3,500. Vernon David states that various authors give the incidence of malformation of the rectum and anus between 1 in 5,000 to 1 in 10,000.

Baby J. S., male, was at birth apparently normal except that there was no anus, and no depression to indicate where it should have been. When he was seventeen hours old, under light ether by the open drop method, incision was made through the perineum back to the coccyx. The loose tissues were dissected upward for a distance of between two and three inches, when the palpating finger detected an area of lessened resistance, and, on slightly more careful dissection, the blind pouch of the rectum was seen. This was dissected loose and opened, and about two ounces of meconium escaped. The mucous membrane was then sutured to the skin at a location where we thought the anus should have been. Although the operation lasted thirty minutes the little patient showed practically no signs of shock and made an excellent recovery. For one year after the operation the rectum was dilated periodically by inserting the little finger, index finger and the thumb at each treatment. The family then returned to their home in Cuba. Nine years later the mother gave me a verbal report that the child was healthy in every way, and that so far as she knew the bowel function and sphincter control were normal.

Obviously no one surgeon sees a sufficient number of congenital malformations of the rectum to draw any definite conclusions. It is only by a number reporting and pooling their cases that any helpful information can be obtained.

Benign Tumors of the Liver

Baby E. W., age four months, male, was brought from a neighboring town because of the fact that the abdomen had been enlarging rather rapidly. On examination the baby seemed normal except that the abdomen was distended tremendously by a mass which on percussion gave dullness throughout the whole abdomen except for slight tympany in each flank. A mid-line incision was made. A tumor which by actual weight was a trifle over three pounds was attached to the under surface of the liver by a small pedicle. The pedicle was severed between hemostats and the tumor easily removed. The rest of the abdomen was normal. The patient was on the table only a few minutes, and after the operation was in fair condition. On the third day he began to grow weaker and died on the fourth day. The specimen was sent to Dr. Winternitz, Professor of Pathology at Yale, who made a diagnosis of myxoma of the liver. Christopher in his recent book makes the following statement: "Benign tumors of the liver are of more interest to the pathologist than to the surgeon. Lipoma, fibroma and myoma have been reported but are extremely rare, and adenoma occurs infrequently." He does not mention myxoma, nor does the system of surgery edited by Dean Lewis mention benign tumors of the liver. This case is reported as one of extreme interest because of its rarity.

Irreducible and Strangulated Inguinal Hernias

Baby M., age three months, female, was admitted with the history that since birth the mother had noticed a swelling in the

baby's groin which would come and go. For the past eight hours the mass had been protruding and could not be reduced. Examination showed an apparently healthy child with a right inguinal hernia the size of a hickory nut and extremely tense. Under light ether a very tight ring was incised. The sac was opened and the hernia reduced. A high ligation of the sac was done and the wound closed.

Baby R. B., age five weeks, male. History was that on a few occasions since birth the mother had noticed a slight protrusion in the right groin. About four hours before admission it was noticed that this mass had returned, was quite hard and could not be reduced. Examination showed a very tense mass the size of a large olive protruding from the right inguinal canal. Under ether an incision was made and a knuckle of bowel found tightly constricted. This was reduced, the sac dissected out and ligated high. The skin was then closed and a circumcision done.

From the viewpoint of the surgeon, hernias in infants may be placed in three groups:

1. Those with symptoms of strangulation. These demand immediate operation. Unlike the dehydrated cases of intussusception and pyloric stenosis, they are usually in good condition and can be operated upon immediately after admission. These are real emergencies and a delay of a few hours may be disastrous.

2. Those cases in which the hernia is irreducible but without evidence of strangulation. These are certainly urgent, and really should be classed as emergencies. While there may be no indication of beginning strangulation, it cannot be excluded definitely. Since the infant is in relatively good physical condition, there is nothing to be gained by delay.

3. Those cases where the ring is large and the hernia protruding most of the time in spite of mechanical support. These are frequently bilateral. They could hardly be classed as urgent, but the results of operation are so satisfactory that I feel we are justified in assuming the slight risk, rather than permit the ring to become more dilated and the infant to be handicapped constantly by the protruding mass.

At operation a high ligation of the sac is all that is necessary. To overlap or even to suture the fascia is unnecessary, and increases the danger of infection. Transplantation of the cord as in adults would be the height of folly. If there be an accompanying phimosis, circumcision should be done.

I had selected from my records for discussion cases of empyema, certain types of meningocele, tumor of the kidney, abdominal enlargement from hydronephrosis and various fractures including those occurring at birth, but time would not permit. The object of this paper is to emphasize two cardinal points:

1. That from a surgical standpoint, the infant is not a miniature adult, and what may be considered fair or even good surgery upon an adult may be poor or even bad surgery upon an infant.

2. That many of these desperately ill infants may, by the aid of a competent pediatrician, become reasonably safe operative risks, and precious lives may be saved.

THE PREVENTION AND TREATMENT OF PELVIC FLOOR INJURIES

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One of our prime aims in obstetric care is to ensure that our patient be left with no permanent disability of any kind after delivery. One of the disabilities to which she is most liable is a lack of proper support of the pelvic organs resulting from overstretching and laceration of tissues, sustained during the course of labor. The object of my short talk is to discuss how these injuries occur, how they may be prevented, and how they may be repaired when they are present.

The discussion will have to be prefaced by a brief resume of the facts regarding the normal support of the pelvic organs. The maintenance of the pelvic organs in their normal position is provided for in two ways —one by what may be called mesenteric supports and the other by fascial and muscle sheaths and diaphragms. Thus the uterus is kept at its normal plane in the pelvis by being embedded at the level of the isthmus and the supravaginal cervix in a matrix of con-

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nective tissue, which is specially condensed at the bases of the broad ligaments along the line of the uterine vessels as they run to and from the uterus to their origin and termination in the internal iliac artery and vein near the lateral pelvic wall. This condensation of fibrous tissue round the uterine vessels constitutes the so-called transverse cervical or cardinal ligament on each side and is the part of the mesentery of the uterus which plays the greatest part in keeping it at its normal level in the pelvis. The rest of the mesentery is the upper part of the broad ligaments with the ovarian vessels, and, secondarily, the round ligaments and the utero-sacral ligaments. All of these latter play a part in the maintenance of the position of the fundus as regards its anteversion and retroversion, but have comparatively little part in the maintenance of normal level.

One of the most apt descriptions of uterine supports is that given by Chipman, who likens the uterus to a person seated in a swing. The transverse cervical ligaments on each side at the bases of the broad ligaments constitute the seat of the swing on which the isthmus of the uterus sits. The cervix hangs free in the vagina like the swinger's legs, while the upper part of the broad ligaments and the round ligaments are like the ropes of the swing which the swinger holds to keep his forward and backward balance.

But if the uterus had no further supports than these it would be pushed downward by intra-abdominal pressure. It requires in addition to be buttressed from below, and this buttress is supplied by the pelvic floor, made up of muscle and various fascial layers and sheaths surrounding the vagina, the rectum, and the bladder.

This pelvic floor or diaphragm is so arranged that there is no continuous gap in the direct line of intra-abdominal pressure. Thus the axis of the vaginal tube is practically at right angles to that of the uterus when the latter is in normal anteversion, so that any tendency for the uterus to be pushed down into the vagina is counteracted by the resistance of the posterior vaginal wall supported by the levator muscles and their fasciae.

Proper pelvic floor support is dependent upon the maintenance of the normal direction of the vaginal axis, and this is dependent on the integrity of the perineum and of the levator muscles and their fasciae. When the vaginal axis comes to be more nearly vertical than horizontal, the anterior vaginal wall, which has little support of its own, no longer has a firm shelf on which to rest, and it begins to sag downwards and backwards, carrying the bladder with it as a cystocele. The cervix is dragged down, and if the uterus happens to be retroverted its axis is now in a straight line with that of the vagina, and further descensus takes place. With cardinal ligaments of normal tone this descent of the uterus may take place slowly, and with intact pubo-cervical fascia the development of the cystocele may take time; but both will ultimately occur in some degree. When proper supports of these organs are also weakened, the development of the prolapse will take place more rapidly.

The rectum is supported primarily by its fascia propria and secondarily by the levator muscles and fasciae. If the latter are injured and not repaired, extra strain is thrown upon the former and a slow development of rectocele will occur. If both levator and fascia propria are injured, the rectocele will develop more rapidly and attain a larger size.

Good levator and perineal support—which means a normal axis of the vagina—together with a normal anteversion of the uterus will ensure a maintenance of the latter at a fair level in the pelvis, even though its transverse cervical ligaments are somewhat relaxed, and will prevent the development of a rectocele and of any large cystocele even if the fascia propria of the bladder has been injured. At the time of delivery there is never direct evidence of injury to the transverse cervical ligaments or to the bladder fascia; and if there were, there is no technique known for their immediate repair.

On the other hand, tearing and injury to the levator muscles, the fascia propria of the rectum, and the perineal body and central raphe of the perineum are always evident when present, and repair can be done at the time. The efficiency of this repair depends upon the correct approximation of the severed structures and the maintenance of this approximation during the healing process.

This is not always easy in the ordinary pelvic floor laceration. Let us try to visualize just what the common lesion is. The ordinary tear begins in the postero-lateral sulcus of the vagina on one or both sides. The point

in the long axis of the vagina at which the tear begins varies. The higher this point is, the more extensive will be the damage to the levator structures. In the spontaneous delivery or in a forceps extraction there is always an indication of when and where the tear begins. It is evidenced by that little trickle of blood which appears after a pain has passed off, or when the traction on the forceps is released. Up to that time there has been no bleeding. When bleeding appears we know that a laceration has begun at the level at which the head is at the time. As the head descends naturally or by forceps traction, the tear extends down through the postero-lateral vaginal wall and into the lateral pelvic floor supports towards the vaginal orifice, becoming gradually more central, so that when it reaches the vaginal orifice it is in the middle line—and it is in this line that the perineum tears. If tears have begun in both lateral sulci the two meet close to the vaginal orifice, and there is only one almost central tear in the perineum. Usually in bilateral tears the apex of the one is higher than that of the other.

It is not easy to effect a perfect repair of such a lesion, for there has been a tearing across of muscle fibres and of fascia on each side, and a great deal of retraction occurs. The large mass of the muscle retracts outwards, leaving only a thin, rather feeble portion towards the middle on each side. Sutures, even when properly placed, are apt to cut out, with the result that, even with perfect healing of the skin perineum, a permanent relaxation of the pelvic floor remains with subsequent prolapse.

Consider now the so-called third degree tear. This usually occurs in the course of the delivery of the aftercoming head in a breech, or in a precipitate delivery of the head through the vulva, where there has been no previous warning that laceration was beginning. This tear begins near the vaginal orifice and is practically dead center, so that as it goes through the perineum it extends into the anal canal and divides the anal sphincter. I have seen patients years after such an unrepaired laceration, and although they have all the discomforts of lost sphincter control they have had no prolapse of any kind. The reason is that this is a superficial tear of the central raphe of the perineum; the levator muscles and fasciae on each side remain intact, so that they do not retract but continue to give support.

All this leads up to the point I want to make—namely, that a modified central—or what may be called a medio-lateral episiotomy, is preferable to the ordinary spontaneous laceration and to the so-called lateral episiotomy.

Let me describe just how a medio-lateral episiotomy is done on my service in the Sloane Hospital for Women. The procedure is carried out when the head or the breech is beginning to distend the perineum. It should be done before laceration of the vagina has begun, as evidenced by the little trickle of blood which I mentioned. If this appears, the incision ought to be made with the next pain, irrespective of the degree of perineal distension. If forceps extraction is indicated, the forceps are applied and gentle traction is made to distend the perineum. With the perineum distended and tightened, either at the acme of the pain in a spontaneous delivery, or by gentle forceps traction, an incision is made with the ordinary curved Mayo scissors, the scissors being placed with one blade inside the vagina and one outside on the perineum. Care must be taken to keep the handles of the scissors in the line of the central raphe of the perineum; otherwise a shelving cut will be made, and this must be avoided. The curve of the scissors is sufficient to carry the lower end of the incision to one side of the anal orifice and the sphincter. In the ordinary case the incision does not extend as far as the level of the anus.

A study of a dissection of the pelvic floor will show just what structures are cut. It will be seen that the incision goes through the center of the triangular ligament, and, in its deeper part, through the line where the two levator muscles and their fasciae merge in the middle line. If it reaches nearer the level of the anus, it is still between the transverse perinei muscles on each side, avoiding the sphincter, so that should extension occur the latter will not be injured and the anal canal will not be entered.

In delivering the head the same care must be exercised as in delivery through an intact perineum. Flexion of the head must be maintained until all of the occipital region is born, and extension allowed only as the rest of the head slips out. Too rapid extension may result in further laceration.

Repair of the Incision

It is our custom to repair the incision before the birth of the placenta. The reasons for this are that the patient is still under anesthesia; that we have time on our hands after seeing that the baby is all right; and that we have never seen any injury to the repair resulting from the delivery of the placenta. If at any time bleeding should indicate that the placenta is separating, it is delivered, and the repair then continued.

A strip of sterile gauze or a sterile gauze wipe with string attached is placed in the vagina above the apex of the incision to keep the field clear of blood. A pair of Allis clamps are placed on each side at the muco-cutaneous junction, and used as retractors. Beginning at the apex in the posterior vaginal wall, a running suture of No. 1 chromic catgut approximates the cut edges to just beyond the skin margin. This suture is not tied, but is left long and is continued at a later stage as a subcuticular stitch to approximate the skin edges. This stitch in the vaginal wall may be through and through, or submucous from the beginning.

With the vaginal tube thus restored down to the skin of the perineum, the severed deeper structures are approximated by interrupted figure of eight sutures of chromic catgut No. 2. As there is very little lateral retraction of tissues, the sutures are easily placed, and they do not tend to cut out.

A running suture of No. 2 or No. 1 chromic, beginning anteriorly, approximates the superficial fascia. At the lower end of the incision the needle brings the suture out on the skin surface.

The running suture in the vaginal wall is now continued down as a subcuticular suture approximating the skin edges, and is brought out on the skin surface at the lower end opposite the fascial stitch. These two sutures are then tied together over the lower end of the incision.

As an additional safeguard we may place a single stitch of silkworm gut near the muco-cutaneous junction, and sometimes one, or even two more along the length of the skin wound. In the event of a break-down of the catgut approximation these may obviate the necessity for a secondary repair. The method of closure may, of course, be varied in many ways. The method I describe has given us the best results. It is the method used by my predecessor in the Sloane Hospital, the late Dr. William E. Studdiford, and carried on and modified by his pupils—notably by William M. Findley.

On a service with interns coming and going, breaks of established technique are apt to occur. In going over our results for the year 1937 we found that we had had an unusual number of complete or partial break-downs of repaired episiotomies. An investigation brought out the fact that the technique just detailed had not always been accurately followed. The matter was taken in hand and fresh instruction given, with the result that 1938 showed a decided improvement. The figures for the two years are as follows:

1937	
Cases of 2nd degree laceration and episiotomy	584
Cases in which some break-down occurred	19, or 3.3%
Cases requiring secondary repair	9, or 1.6%
1938	
Cases of 2nd degree laceration or episiotomy	706
Cases in which some break-down occurred	11, or 1.6%
Cases requiring secondary repair	2, or 0.3%

When a break-down occurs, it usually means a longer hospitalization of the patient. In 1937 there was a total of 177 extra hospital days care given for this reason, while in 1938 there were only 50 days. This was a saving of 127 hospital days, which at $4 a day meant a saving to the hospital of $508. (Our ward patients are taken care of on a flat rate, irrespective of the time they may have to stay on the obstetrical service.)

This experience brought home to us anew the necessity for constant and close supervision of every detail of what we regard as established procedures.

The test of any procedure is in the follow-up of the patients. I can say, unhesitatingly, that the ultimate results as regards pelvic floor support are better with a median episiotomy and repair, as described, than after spontaneous laceration with repair, and even after delivery without gross laceration.

Our experience is that those patients who have had median episiotomy and repair require the same procedure in subsequent deliveries, whereas many who have had spontaneous lacerations and repair deliver subsequently without further laceration. This may sound like a left-handed argument for episiotomy but it really is not; for it means that when properly done the procedure re-

stores the patient to her original nulliparous condition so far as her pelvic floor supports are concerned.

But episiotomy does still more than that. It saves the child from injury by shortening the period during which the head pounds on the perineum; and, by allowing the head to slip back at the outlet, it takes the strain off the fascial structures anteriorly — notably the fascia propria of the bladder—and minimizes the risk of cystocele developing.

With a perfect result so far as the pelvic floor is concerned we have still another responsibility to our patient—namely, to see to it that the uterus during its involution returns to its normal anteverted position. Up to the tenth or twelfth day of the puerperium it is prevented from retroverting because it is supported posteriorly by the lumbar spine and the promontory of the sacrum. After this, as it descends below the pelvic brim, it is quite apt to tilt backwards. It should be a rule, therefore, to examine bimanually every patient on the twelfth or fourteenth day of the puerperium. If the uterus is found to be retroverted, it can then be very easily replaced and held in place with a pessary, which is left in until involution is complete at the end of six weeks. We further make it a rule that every patient be examined bimanually at the end of the fourth week of the puerperium, as we not infrequently find that a uterus, in perfect position at the end of the second week, has become retroverted by the fourth. If such be the case, the uterus is replaced and a pessary inserted.

If the uterus is thus kept anteverted all strain is taken off its fascial and ligamentous supports. These will involute normally, and so retain it in proper position when the pessary is removed. If replacement and retention are not effected before the end of the six-week period of involution, the retroversion will be permanent. We have found the use of a pessary in this way much more certain in its results that the use of the knee-chest position, or of exercises like the monkey crawl.

It has been objected that there may be risk of infection in introducing a foreign body into the vagina so early. All I can say is that over a period of many years I have never seen infection occur.

Another very valid objection is that in introducing the pessary we would cause a great deal of pain and might disrupt a recently repaired pelvic floor. This objection is done away with by the pessary devised by my colleague, Dr. William M. Findley. It is an ordinary Smith-Hodge hard rubber pessary, with a small section of soft rubber let into each pole. With this device the pessary can be folded on itself and be introduced through the narrowest vaginal orifice without pain and without injury to any recent wound. When in the vagina it expands to its normal shape. I commend this pessary to you not only for your puerperal patients, but for every case that requires pessary treatment.

A TUBERCULOSIS CASE-FINDING PROGRAM IN A WOMAN'S COLLEGE

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When one looks at so long and complicated a title as that which has been assigned to me. it makes one feel that emphasis put on a word here or there might make this very complex subject more interesting and less diffuse. At first glance the most important word in this subject might seem to be "Woman's", for certainly it is not hard to see that the tuberculosis problem in a woman's college is at once more vital and more acute, because of increased susceptibility of the students, and also more difficult, because of the nervous reactions of the adolescent girl. These factors, and particularly the second, I will discuss briefly in this paper. But on second thought I find my eye and mind clinging to the phrase "Case Finding". Surely here is the crucial point. How shall we find tuberculosis where it exists hidden and obscure? How bring it out into the open before the signs are so clear that "he who runs may read"—and weep?

It is not necessary, before this audience, to belabor the point which has time and again been emphasized to college presidents and deans, namely that if early cases of tuberculosis are not sought with diligence, care, and by most skillful and modern methods, they will not be found. However, a brief resume of the data submitted by the Tuberculosis

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Committee of the American Student Health Association will serve to give added proof to a maxim which we all accept.

This committee, which under the chairmanship, first of Dr. Lee Ferguson of Western Reserve University, and later of Dr. Charles E. Lyght of Carleton College, has done yeoman service in stimulating college health departments and college administrators to an appreciation of their duties and opportunities in tuberculosis work, published its first report in December, 1933. In that report only twenty-five colleges had been questioned as to their tuberculosis case-finding programs, and these were supposedly leaders in college health work. Of the twenty-five, only fourteen made any report, and of these only eleven gave data accurate enough to be serviceable as to their procedures and findings.

On the basis of the reports from these eleven institutions, however, the same comparisons can be made as those on the 1938 report of the committee, in which 233 colleges co-operated. It was found that seven of the eleven institutions reporting in 1933 had what might be termed a fairly adequate tuberculosis case-finding program, by which is meant that these schools did not depend entirely on symptoms or even on physical signs for their diagnosis, but went after the cases with tuberculin testing, x-ray, or both, while four had no such definite machinery set up for this work. In the seven schools with an adequate program 262 cases of adult type, infiltrating pulmonary tuberculosis were found in a total student population of 38,932. This is a rate of .67 per cent. In the four schools having no program, on the other hand, only eleven cases were found in a student population of 15,374, or a case rate of .07 per cent. In other words, almost ten times as many cases, proportionately, of infiltrating pulmonary tuberculosis were found in institutions which were alive to the necessity of seeking for them.

In 1934 the same fourteen institutions were asked for data as in 1933, with a case rate of .59 per cent for those with an active program as against .14 per cent for those without such a program.

In 1935 the figures were .57 per cent against .12 per cent, with many more colleges responding; in 1936 .42 per cent against .18 per cent; in 1937 .34 per cent against .11 per cent; and in 1938 .22 per cent against .01 per cent, with a student population of 261,949 in the institutions where an active search for tuberculosis was going on.

Of course these figures indicate other things beside the incontrovertible fact which they show so clearly—namely, that through the years of this study, from three to twenty times as much infiltrating pulmonary tuberculosis has been found among college students subjected to a real case finding program as in those among whom no such effort has been made. They also indicate a gradual and steady decline in the amount of tuberculosis present in college students, and an almost equally encouraging increase in the number of institutions which are alive to the problem and actively engaged in its solution.

Our own experience with a case finding program at the Woman's College of the University of North Carolina began in the spring of 1932, when under the enthusiastic leadership of Dr. Anna M. Gove, then head of the college health department, and with the active assistance and inspiration of Dr. P. P. McCain of the North Carolina Sanatorium, the first tuberculosis clinic was launched. At that time it was impossible to get the full co-operation of students because the idea was so new, and pioneer educational work had to be done. However, in spite of the fact that we were successful in getting less than half of our positive tuberculin reactors to have an x-ray of the chest, five cases of adult type pulmonary tuberculosis were found in a student body of 1608, or a case rate of .31 per cent.

Following that initial experiment with the whole student body, we have carried out a program which has varied somewhat in method from time to time, but which has aimed at a case-finding survey—largely compulsory — of all entering students, and a more or less voluntary survey of the graduating class. We are not under any illusion that this is the best program which could be evolved from the ideal public health standpoint. It has many shortcomings, of which probably the most glaring is that only entering students are involved in a compulsory survey. But in spite of these faults we have been able to make a diagnosis of adult type pulmonary tuberculosis in our en-

tering classes varying from .49 per cent in 1935 to .24 per cent in 1938. While no completely accurate data are available, I can say from my own experience, dating from 1925, that the diagnoses of pulmonary tuberculosis made on our students before 1932, when this program was inaugurated, were practically nil.

Our figures then, coupled with those previously quoted from the whole group of colleges, make absolutely ridiculous quotations from letters received by the Tuberculosis Committee of the American Student Health Association, from colleges where there is no case-finding program. I take the liberty of repeating a few of these quotations taken from the 1938 report of the committee.

"I beg to advise you that we have no tuberculosis in —— College."

"From my knowledge and experience of the place I would say that tuberculosis is not in any way a part here."

"Our students come from only the best homes. We do not have any cases of tuberculosis."

This brings us naturally to the subject of methods, which, while not so interesting as that of results, is of the utmost importance in a program of this kind. In order to be as simple and direct as possible, I will state briefly what our methods have been in the past, and what they are at present; and then try to evaluate briefly the various changes made, and perhaps come to the defense of our present method of the universal chest x-ray, which may seem to many of you to require considerable defense.

In 1932, when the program was first inaugurated, we attempted to do a Mantoux skin test, using a dosage of .1 cc. of 1/1000 O. T. on every student. While this was never entirely possible, owing to the fact that there was objection to the test on the part of a very few parents, but more particularly because we were never able to get quite one hundred per cent co-operation from the students in reporting back to the physicians to show the result of their skin tests, we soon reached the point where a very large percentage—almost one hundred per cent—of our students were having Mantoux tests made and interpreted. The intradermal injections were made at the college gymnasium, where the students were registering for the first semester, and the tests were read at the Infirmary forty-eight hours later. All positive reactors were sent for and asked to sign up for chest x-rays, for which they were at first charged $2.00, then $1.50, and later $1.00 in addition to their regular medical fee. These plates were at first made at the Guilford County Sanatorium, but in 1934, with the purchase of x-ray equipment by the college, they were made in our Physics Department, in connection with a course for laboratory technicians being given by that department. A good deal of pressure was put upon positive reactors to have films taken; but while we found it much easier to induce students to have x-rays made right on the campus than when there was the difficulty of transportation to the Sanatorium, we were never entirely successful in obtaining their co-operation. However the percentage of films made of positive reactors constantly increased, so that while there were less than 50 per cent taken in 1932, by 1935 there were 94 per cent. I might say parenthetically that these percentages correspond rather favorably with those obtained in other colleges where this method is used. During all this time the plates were read by the staff of the North Carolina State Sanatorium, who by their active co-operation have made all this work possible.

In 1937 we changed our method to that of requiring a chest x-ray of every entering student without attempting a Mantoux test on any of them. The universality of this procedure made it possible to collect the fee with the tuition, thus obviating the objection of the individual student to expending a dollar, more or less voluntarily, for an object which she often chose to consider useless. It was therefore much easier to get complete coverage of the entering classes, and we have been successful in this for the past two years. In 1937 these plates were all sent to the State Sanatorium for examination; but with almost 900 entering students, this procedure imposed an unbearably heavy burden upon the staff. So in 1938 we examined all plates ourselves, eliminating thereby the obviously negative ones, and sending to the Sanatorium physicians only such films as seemed to us possibly suspicious of tuberculous involvement.

When reports come back on these plates from the Sanatorium, it is our custom to send form letters to all students having

negative films congratulating them on that fact. Those showing either Ghon tubercles or calcified glands, and those showing adult infiltration are interviewed personally, the lesion found is carefully explained to them, and advice given them as to the future conduct of their case, if any seems necessary. Letters are also sent to the parents of all students having any positive lesion, in which as full an explanation of the condition as possible is given. Personal interviews with the parents are suggested, if the lesion seems to be at all serious or active, and many parents themselves seek such interviews concerning their daughters' reports. It is always urged that the letters be shown to the family physician, that the case be fully discussed with him, and that the student herself go to him for examination and advice, taking the x-ray film with her. A very few of our students have had lesions extensive or active enough to require Sanatorium treatment, and all other cases have been followed carefully here at the college, with frequent x-rays, temperature records, sputum examinations, etc., as the occasion demands. Tuberculin tests are done on students with positive x-ray findings, and occasionally show negative reactions. Such a condition of course calls for further study of the student and of her x-ray plates, and for further and heavier tuberculin dosage.

We have never made the examination of the entire senior class as compulsory a matter as that of the freshmen. Differing amounts of pressure have been put on the seniors from year to year with varying results, but with never more than a rather small percentage responding. As we all remember, dollar bills are hard things to come by near the end of one's senior year in college, and this is particularly true in a woman's college. Moreover, most of our seniors have been reasonably healthy for the four years they have been under our observation, and many of them have gained weight. Symptomless, excessively occupied with the social and academic whirl that makes up the modern college, and usually poor as Job's turkey, a senior is not easily persuaded to invest her time and her dollar in an x-ray of her chest.

This year I thought it would be both interesting and educational—chiefly to myself—to see what an appeal to reason, without other pressure, would do for this situation. Accordingly, I wrote a letter, explaining as carefully and clearly as possible, exactly why it seemed to us wise for young women about to graduate from college to take advantage of the opportunity offered them for a chest x-ray at an exceedingly reasonable price. The letter ended with the simple but wistful hope that they would see the situation as I did and come to the Infirmary and sign for x-rays. With nothing more than this, almost exactly one-third of the approximately 400 seniors responded to this letter and had chest plates made. Not good, you say! Well, not bad either, I think, considering all the factors involved. A few more in whom for some reason x-rays seemed particularly necessary were later interviewed, and as a result have had plates made. But the first group were entirely uncoerced.

It is probable that in the future we should make x-ray examination as hard and fast a rule for seniors as for freshmen. Indeed the fact that the senior is at a more vulnerable age than the freshman would make this seem most necessary. However, our present method might be called an educational experiment, which perhaps has some inherent value of its own.

Finally, let us return to an evaluation of the two methods of examination which we have tried at this college, and which have each been used at different colleges—namely tuberculin skin testing with the x-ray examination of positives vs. the primary x-raying of each student without preliminary skin testing. Let me say first of all that "evaluation" is far too ambitious a term for me to use at this point. Indeed, it is doubtful if a true evaluation could be made by anyone, given the limited and confusing data which we have at present; and certainly my extremely limited knowledge of the diagnosis of tuberculosis would make such an attempt valueless and even pretentious on my part. My excuse then, for embarking upon this subject at all, is that a brief resume of the arguments pro and con, and some record of the results obtained by us and by others with the two methods, might serve to stimulate a real fact-finding program along this line.

First, then, it would seem that the infallibility of the Mantoux test as a criterion of tuberculous infection must be more nearly

established or disproved by unbiased data. If it is possible for persons who suffer from a tuberculous infection to show negative intradermal skin tests, then we may be passing up cases of tuberculosis unless we x-ray each individual in the group. Of course we are all aware that a severe or overwhelming tuberculous infection as well as certain other acute infections occasionally result in a negative Mantoux test. But these conditions are not apt to be very common or confusing in routine college health examinations.

On the other hand, there are some indications in recent publications that routine tuberculin testing is often far from infallible. For instance, a paper in the January 1939 issue of the *American Journal of Public Health*, written by Drs. Lusden, Dearing, and Brown, of the U. S. Public Health Service, shows first, the wide variation in percentage of postive reactors, from 10.2 per cent up to 88.6 per cent, depending on the preparation and dosage of tuberculin used; and, second, throws discredit on any tuberculin testing program, by showing that in Giles County, Tennessee, of 12 school children who showed pulmonary lesions, regarded as clinically significant, 7 were negative and 5 positive to a routine intradermal test with a standardized commercial P. P. D. in a dosage considered adequate by such an eminent authority as Dr. Esmond Long of the Henry Phipps Institute.

Figures not quite so damning to the tuberculin test, but which still tend to throw considerable doubt on results, at least with the average dosage of Old Tuberculin, were editorially discussed June 18, 1932, in the *Journal of the American Medical Association*. The data were taken from a report of P. D. Hart to the Medical Research Council of London, in the same year. He had studied 1030 clinically tuberculous patients of all ages, and found that 38, or 3.7 per cent failed to react to .1 cc. dosage of a 1/1000 solution of O. T., which is the average dose, and that 2.7 per cent were negative even to .1 cc. dosage of a 1/100 solution.

In addition the records of the Tuberculosis Committee of the American Student Health Association show that in the year 1937, when separate records were kept for colleges using different methods of case-finding, .3 per cent adult type cases were found in colleges which used the combined methods of skin testing and x-ray, whereas .7 per cent cases were found in the colleges with a universal program of x-rays. In other words, case-finding was over twice as successful when each student was x-rayed regardless of his tuberculin test.

Of course a good deal of this argument might be eliminated if an adequate, and at the same time safe dosage of tuberculin could be agreed upon by all authorities. At present the two dose method with P. P. D. seems to be the most favored, and to meet best the qualifications of adequacy and safety. But here we are brought face to face with the untold practical difficulties, which every college that has tried this method has met, in administering two doses of this material to a large group of students. For my own part it seems to me almost impossible to obtain enough student co-operation in the administration and reading of two separate doses to make it practical at all. After all, important as it is, tuberculosis case-finding is only part of our job as student health physicians, and the time and effort involved in such a program would take an overwhelming amount of the energy which we need to devote to the whole problem of student health.

In answer to such data and argument about the reliability of tuberculin testing, those who advocate such testing as the most important case-finding procedure (and they include excellent tuberculosis specialists) point to the fact that only by some form of tuberculin testing is it possible really to indicate to a student whether she has ever had a tuberculous infection. We all know and admit that many such infections leave no calcified areas in the lungs, detectable by x-ray examination. They say too, and truly, that very important information is obtainable by a negative tuberculin test in the freshman year, with a positive test in a subsequent year — information as to contacts, etc., which is obtainable in no other way. And all this might easily be missed without the tuberculin test.

Other arguments and other data might easily be added by the advocates of each of these methods. The controversy rages, and those of us who deal practically with the problem in the colleges await authoritative research on the whole problem. I note with encouragement that at the next meeting of

the National Tuberculosis Association, to be held in Boston in June of this year, there will be a symposium on the subject, "Mass Tuberculin Testing and X-Raying — A Review of the Present Status", and that one paper in that symposium is to be on "Tuberculin" by Dr. Esmond Long, Director of the Henry Phipps Institute, and a second is on "X-Ray Findings in Negative and Positive Reactors", by Dr. Bruce H. Douglas, Tuberculosis Controller of the Detroit Department of Health. It would seem probable that statistics which might be offered, particularly by Dr. Douglas, on the extensive work done in Detroit during the last two years, would go far to solve some of the problems which I have tried to raise in this paper and which have long troubled the minds of all public health administrators.

In the meantime I suppose most of us will go on as we have been doing, undertaking the type of program which seems to us most practical, considering equipment and staff, and which also seems to us relatively efficient in finding cases of tuberculosis. Thus we note that several universities with large medical staffs, who can employ expert roentgenologists and have adequate fluoroscopic equipment, are relying on the fluoroscope to act as a screen in the detection of cases, following this with flat or stereoscopic plates in suspicious cases. More of the women's colleges are using x-ray methods than are the men's colleges, and I suspect that, as with us, the emotional difficulties incident to tuberculin testing in young women, caused the preference for the universal x-rays.

Thus it can be seen that this problem of finding cases of tuberculosis in college students is far from a simple one. We want you to know its complexities and difficulties. If this rather wandering and far from conclusive paper has helped to give you, the physicians of our students, a sympathetic understanding of our problems and how we are attempting to meet them, it may be worth while to have presented it to you.

Discussion

DR. J. H. McNEILL (North Wilkesboro): Our county is using a case-finding method which is outlined by the state of North Carolina. Among the children of school age, tuberculin testing is done on all children who show an underweight of 10 per cent or more. Positive reactors are x-rayed. Unfortunately, the county has no money to pay for such x-rays and the family has to do so, at the full rate whenever they can, and at charity rates otherwise at our local hospital.

Our next effort to find tuberculosis is through the fluoroscopic clinic also offered by the state and held yearly. We make a strenuous effort to have any person who has any contact whatsoever with tuberculosis to have a fluoroscopic examination, and if anything significant is seen there, to have chest films made.

In that way we have been able to pick up quite a good many cases which otherwise would probably have gone on to full active tuberculosis. I thoroughly agree with Dr. Collings that the diagnosis must be made early and soon. I don't know who it was that said that early tuberculosis should be seen and not heard.

CHAIRMAN YODER: Early tuberculosis must be seen and cannot be heard.

CHRONIC ACETANILID POISONING WITH ADDICTION

DONALD McINTOSH, JR., M.D.

MARION

The toxicity of acetanilid in excessive dosages and the clinical picture of acute and chronic acetanilid poisoning with addiction have been recognized by the medical profession since the introduction of the drug as an antipyretic in 1886. As early as 1895 case reports [1] of acetanilid poisoning began to appear in the medical literature. Extensive use by the profession, and the early introduction of the drug to the laity in the form of various proprietary nostrums and headache powders, soon led to a large number of case reports of acetanilid poisoning Austin and Larrabee[2], Sutherland[3], Robinson[4], and Quigley[5], reported cases of son[4], and Quingley[5], reported cases of acetanilid poisoning, and expressed their disapproval of the widespread use of the many

Read before the Section on General Practice, Medical Society of the State of North Carolina, Bermuda Cruise, May 10, 1939.

1. Rosenberger, R. C.: A Case of Acetanilid Poisoning with Recovery, Phila. Polyclinic 4:460, 1895.
2. Austin, A. E., and Larrabee, R. C.: Acetanilid Poisoning from the Use of Proprietary Headache Powders, J.A.M.A. 46:1680, (June 2) 1906.
3. Sutherland, E. L.: Acetanilid Poisoning, Medical Sentinel, Portland, Oregon 14:466, 1906.
4. Robinson, W. J.: Impotence Caused by Excessive Consumption of Bromo-Seltzer, J.A.M.A. 47:508, (August 18) 1906.
5. Quigley, D. F.: Acetanilid in Bromo-Seltzer, J.A.M.A. 46:454, (March 24) 1906.

nostrums and proprietary powders. Nadler[6], Stengel[7], Fisher[8], and many others have stressed the strong habit producing qualities of the drug. Excellent experimental and clinical studies on the physiological effect of acetanilid have been made [9], [10], [11]. Today, however, I feel that few of us realize the true proportions of the problem of drug poisoning, and certainly the current literature is not indicative of the extent of the problems arising from addiction to acetanilid.

Acetanilid belongs to the group of so-called "coal-tar antipyretics" and occurs as a white powder or crystals. It is very cheap and can be bought in bulk for about thirty cents per pound. Because of its relative insolubility, it is usually dispensed in powder or tablet form. Hale[12] has shown experimentally that the addition of sodium bicarbonate decreases the toxicity of the drug, while caffeine tends to increase it.

Acetanilid is used as an antipyretic, an analgesic, and locally as an ointment or dusting powder in various skin diseases. The less toxic coal-tar derivatives, such as phenacetin, and the salicylates are now thought to be more suitable as antipyretics, and have largely supplanted its use. It is rarely used locally now because of the dangers of toxic absorption. Herricks and Irons[12A], Gartman and Ball, and Rosenberger[1] reported cases of acetanilid poisoning from local absorption.

Acetanilid is now used chiefly as an analgesic agent. The drug is remarkably efficient and quick in relieving pain, and in similar doses is apparently more powerful than the other coal-tar preparations. Acetanilid is especially useful in the neuralgic or muscular types of pain. Headaches and migraine can sometimes be better controlled with it than with other drugs. Traumatic pain is not so effectively combated. Sodium bromide enhances the sedative effect on the cerebrum, and the combination of codeine and acetanilid often shows an analgesic action comparable to that of morphine.

I wish to stress the fact that acetanilid, dispensed in ordinary therapeutic doses by reputable physicians who understand the possibilities of toxic effects and the tendency to habituation, is a useful and comparatively safe drug. Lowy and Helms[9] and others have shown through careful animal and human experiments that the drug in ordinary doses does not have any deleterious or permanent effect on the body.

Acetanilid in excessive amounts or in susceptible persons acts as a powerful poison. The poisoning occurs in both the acute and chronic forms, and numerous deaths have been reported. Kebler, Morgan, and Rupp[13] discussed the result of a questionnaire to 288 physicians, and found that 219, or 76 per cent, had observed instances of acetanilid poisoning. Of the 614 cases reported by these physicians, there were 17 deaths, some occurring from doses as low as 1½ grains in infants and 20 grains in adults. Summers[14] reports a case of severe poisoning following the administration of 8 grains of acetanilid for relief of headache. Quigley[5] reported severe poisoning from a single dose of Bromo-Seltzer, and Tyrell's[15] patient barely escaped death from one dram of acetanilid powder.

The onset of acute poisoning is rapid and may quickly assume alarming proportions. The outstanding features are deep cyanosis of the lips and entire body, and the symptoms of collapse. The temperature drops to subnormal and there is marked sweating and prostration; the respiration is slow and shallow; the pulse weak and rapid with irregularities. Coma and cardiac arrest soon follow.

Chronic poisoning is at times more difficult to detect, because in some patients the symptoms are not pronounced, and because patients addicted to the use of acetanilid

6. Nadler, W. H.: Acetanilid Addiction: A Report of a Case, J.A.M.A. 74:1717, (June 19) 1920.
7. Stengel, A.: Chronic Acetanilid Poisoning: Report of Two Addiction Cases, J.A.M.A. 45:243-245, 1905.
8. Fisher, L. C.: Chronic Acetanilid Poisoning, J.A.M.A. 100:736, (March 11) 1933.
9. Lowy, O., and Helms, S. T.: Study of the Physiological Effect of Acetanilid on Human Subjects, Medical Record 140:561.
10. Yound and Wilson: Toxicological and Hematological Studies of Acetanilid Poisoning, Jour. of Pharm. and Exper. Therap. 27:133, 1926.
11. Payne: Acetanilid Poisoning: A Clinical and Experimental Study, Jour. of Pharm. and Exper. Therap. 53:401, 1935.
12. Hale: The Cyclopedia of Medicine, Vol. I: 48.
12A. Herricks and Irons: Chronic Acetanilid Poisoning, J.A.M.A. 46:351, 1906.
13. Kebler, Morgan, and Rupp: The Cyclopedia of Medicine, Vol. I: 51.
14. Summers: A Case of Acetanilid Poisoning, N. Y. Med. J. 71:426, 1900.
15. Tyrell: Acute Acetanilid Poisoning, J.A.M.A. 46:955, 1906.

often try to conceal or minimize their affliction.

The symptoms of chronic poisoning usually follow a definite pattern, and produce a symptom complex which Gardinier[16] states is diagnostic of the condition. Certainly, examination of the various case reports reveals a marked similarity of symptoms and physical findings. The onset of symptoms is usually gradual and they are often obscured by the complaints or symptoms for which the acetanilid was originally taken. The most striking symptom is marked cyanosis, which is most noticeable at the lips, mucous membranes, nose, lobes of the ears, and the fingers. There is usually some degree of anemia, so that the skin has a pale, bluish color. General weakness, easy fatigability, palpitation and dyspnea are constant complaints. The appetite is poor, and various digestive disturbances are common. Constipation alternating with diarrhea is often seen. Nervous excitability has been described, but as a rule the patients are rather dull and apathetic, with a tendency to insomnia. The pulse is fast and compressible. Enlargement of the heart, spleen, and liver has frequently been noticed [16] [17].

Most investigators agree that there is a definite anemia due to the destructive action of the acetanilid on the red corpuscles. Payne[11] found that the initial action of the drug is destructive, producing a severe anemia; but with prolonged administration, there is excessive stimulation of the blood forming organs, and the rate of red cell formation may be greater than the obstructive rate, thus producing a relative increase in the red count and hemoglobin. The white blood cell may be affected also. Kracke[19] observed a case of agranulocytosis resulting from acetanilid. The blood uniformly appears dark or chocolate color in this type of poisoning.

There has been a marked divergence of opinion as to the etiology of the cyanosis. The formation of methemoglobin in the blood is in all probability an important factor, although the observations of numerous investigators tend to minimize this element [20], [10], [21], [9]. According to these and other writers, the cyanosis is due to the presence of dark colored derivatives of para-aminophenol in the plasma and tissues, the para-aminophenol resulting from the decomposition of acetanilid. The para-aminophenol is secreted in the urine, producing the dark, reddish brown color that is characteristic of all cases.

Tolerance to the drug is developed in most instances and at times may become very pronounced. Enormous doses of acetanilid have been taken in some cases with little toxic effect. The severity of the drug addiction usually parallels the degree of tolerance. Withdrawal symptoms are apt to be quite severe, with exaggeration of the complaints for which the drug was originally taken.

Two case reports of chronic poisoning with addiction will be presented:

Case 1: C. J., 47, a white male textile worker, was seen at my office in June 1936, with the chief complaint of severe frontal headache. He stated that the headache, which first appeared nine years previously had begun shortly after starting work on the night shift in a textile mill. During the first few years, he did not consult a physician but sought relief in various patent remedies. Five years previously he began taking "B. C. Headache Powders," and soon found that this was the only remedy which would give him relief. The headaches gradually increased in severity and a proportionately larger number of powders was required. At the time of his first visit, he was taking from 6 to 10 powders daily. Upon being questioned, he revealed further symptoms. He stated that for two or three years he had not been in good health. His appetite was poor, and there was some weight loss. He tired easily and had difficulty at times in continuing his work. Moderate exertion caused palpitation and shortness of breath. He stated that he was bothered with a gaseous type of indigestion which he attributed to constipation. At intervals there were attacks of "upset stomach" with vomiting and diarrhea. He believed that his vision was poor.

16. Gardinier: Chronic Acetanilid Poisoning a Perfectly Definite Symptom Complex, Boston M. and S. J. 165:199, 1911.
17. Stengel and White: A Case of Acetanilid Poisoning with Definite Blood Changes, U. of Penn. Med. Bulletin, 15:462, 1902-1903.
19. Kracke: Relation of Drug Therapy to Neutropenic States, J.A.M.A. 111:1255, 1938.
20. Bachman: Cyanosis from Acetanilid, N. Y. Med. J. 65:708, 1897.
21. Lundsteen: Chronic Acetanilid Poisoning, Abstracts, J.A.M.A. 111:2534, 1938.

The patient was of small stature and appeared rather weak. He seemed dull, apathetic and resentful. The outstanding feature of the physical examination was the peculiar color of the skin. The patient was pale and anemic, but a bluish, cyanotic tinge was superimposed on this pallor. This cyanosis was most evident at the lips, mucous membrane, and fingers. The nail beds were a pale, bluish-white color. The pulse was slightly accelerated, (80 per minute), and the blood pressure rather low (110/70). There were carious teeth, diseased tonsils and epigastric tenderness. The rest of the examination was essentially negative. The urine was dark amber, with a questionable trace of albumen.

An eye consultation was advised, and the subsequent examination revealed some refractive error with eye strain. I believe this to be the original cause of the headaches.

I next saw this patient about one year later, when I was called to his home by his wife, who told me that her husband had "lost his mind". She stated that he had been steadily increasing his consumption of B. C. powders, and had recently been taking large doses of brominyl and barbital in addition. On one recent occasion he had taken twenty-two B. C. powders within a four hour period, which represents approximately 88 grains of acetanilid and 264 grains of bromide. With the increase in drugs, the mental changes had become increasingly apparent. Because of the pronounced mental derangement and the impossibility of controlling the patient at home, he was sent to a nearby sanatorium for a few weeks. He was discharged, apparently relieved of his drug addiction.

When questioned recently, he stated that his headaches quickly returned after his discharge from the sanatorium, and he was forced to go back to the B. C.'s for relief. He is now taking approximately 40 to 60 grains of acetanilid daily. The cost of these powders amounts to $2.50 to $3.50 each week.

Case 2: J.Y. S., 48, a white male textile worker, complained of persistent headache, nervousness, and intermittent cough extending over a three year period, and general weakness. He also complained of various pains all over the body, most marked in the chest and back. Other symptoms were shortness of breath, and a gaseous type of indigestion. Recently he was having attacks of dizziness and "blind spells". Examination of the patient revealed an early Bronchiectasis with Vincent's organisms predominating in the sputum. The pulse was slightly fast, B. P. 180/110. There was slight cardiac enlargement and general tenderness throughout the abdomen. There was evidence of Vincent's infection of the gums. In this patient also, the striking finding was the marked pallor and cyanotic appearance of the skin and mucous membrane. There was a definite icteric tint to the sclera.

The patient admitted that for the past eight years he had been taking large amounts of "B. C. Headache Powders" for the relief of chronic headache and nervousness. He had gradually increased the amount necessary for relief, so that at the present time he averages twelve to eighteen powders containing 48-72 grains of acetanilid daily. At times he has taken more. The cost of his powders usually represent the earnings of one day's work each week. He states that he finds it impossible to work without the powders and that he usually has to take one or two during the night. His wife says that he has lost a great deal of time from his work since he began the B. C. habit, and in spite of repeated warnings, he continues with the addiction.

Comment

Acetanilid poisoning and drug addiction have constituted a problem to the medical profession since 1900. The indiscriminate use of acetanilid and the early introduction to the public of the various proprietary nostrums containing acetanilid led to many cases of poisoning. As early as 1906 Austin and Larrabee, in reporting two cases of acetanilid addiction from a preparation called "Nervease" state: "The lesson is that drugs of this dangerous character should not be dispensed except on a physician's prescription, and their sale should be as strictly guarded as is that of Strychnia or aconite." Following this and other publications adverse propaganda by the medical profession apparently produced a relative decrease in the number of cases of poisoning and addiction. However, within the last few years there has been a tremendous increase in the number of cases, due to the wholesale advertising of patent medicines to the laity.

One cannot read a paper, listen to the radio, or drive along country roads without being impressed with the extensive advertising campaign. Such nostrums are sold without the slightest restrictions or warning concerning toxicity, excessive dosages, or habit formation. The various types of powders are dispensed in large quantities everywhere from grocery stores to filling stations. As a result of inquiries at one of the grocery stores in a mill village in my community, I found that this store alone sold over one gross of packages containing two powders each of a well known patent powder each week. The sale in another store in a different mill village averaged a gross every three weeks. These are rather startling figures when we realize that there are numerous other places dispensing the same powder in each community. Incidentally, the clerk in the first store mentioned the fact that practically all of the powders were sold each week to the same customers, numbering about twelve in all.

The two headache powders most commonly used in my district are known as "B. C." and "Stanback." A recent analysis of these powders by government chemist for the Food and Drug Administration (J. A. M. A., July 23, 1938, Page 338) showed each powder of B.C. to contain approximately four grains of acetanilid, 6½ grains of salicylic acid, and 12 grains of potassium bromide. The Stanback powder contained about 2 grains of acetanilid, 6 grains of acetysalicylic acid, and 12 grains of potassium bromide. Bromo-Seltzer, which has long been a favorite, contains approximately 3 to 3½ grains of acetanilid to the dose.

Chronic acetanilid poisoning with addiction is found among all classes of people, but is a major problem in the industrial and rural communities. It is very prevalent in the textile districts of the South. Payne[11] states that each week several cases of chronic poisoning by "pain killer" remedies are seen in the out-patient department of Duke Hospital. Every physician with whom I have discussed the problem has seen various instances of the social, economic, and physical damage produced by acetanilid addiction.

The family physician and general practitioner is the one who is most frequently called upon to treat these unfortunate victims, and it is this group of the medical profession which should be vitally interested in working out a solution to this ever-increasing problem. It represents a challenge which we should meet at once.

I can see only one proper solution to the problem arising from the indiscriminate use of such toxic and dangerous drugs as acetanilid. Dispensing of the drug should be limited to the medical profession, and the prescriptions should be non-refillable, as with the narcotics. Until the drug is placed on this basis, it is our duty to acquaint the public by every means possible with the dangers and habit-forming possibilities of nostrums containing acetanilid.

Discussion

DR. T. W. BAKER (Charlotte): I want to congratulate Dr. McIntosh on a very splendid paper indeed.

There is one little point I would like to emphasize here: In many of these cases in which we are seeing poisonings from the patented headache remedies, the trouble is due as much to bromide intoxication as it is to acetanilid, I think. We are finding now far more frequently than we used to believe that a lot of our psychoses of a temporary nature are really due to bromides, and several recent surveys at mental sanatoria have revealed the fact that a number of patients are there because of a bromide intoxication. If we take a blood bromide on these patients we find it up above the level of 150 milligrams per 100 cc. of blood, which is usually a psychotic level. If we eliminate patent acetanilid bromide preparations, and give these patients sodium chloride intravenously and by mouth, we will find that many of our severe psychoses of a temporary nature will clear up within about a week's time.

The Interpretation of Laboratory Findings.—A basal metabolism which is reported as 15 per cent above normal may or may not be significant, and an electrocardiogram showing a prolonged conduction time may be due to one of several factors, but in either case the physician should not be forced to depend for the interpretation on the man who does the laboratory work and who presumably has a less intimate knowledge of the clinical condition of the patient. The clinician himself should be able to appraise the laboratory findings if the patient is to derive the greatest benefit.—Francis W. Peabody: Doctor and Patient, New York, The Macmillan Co., 1939.

Clinicians Needed More Than Technicians. — In spite of the extraordinary influence which the laboratory has had on the development of medical science there is as yet no cause for the physician to feel that he cannot keep up with the requirements of the best modern practice. All of the more important elements are easily within his grasp. The need in clinical medicine continues to be, not for men trained in many laboratory methods, but for men well grounded in a few methods—not for better technicians, but for better clinicians.—Francis W. Peabody: Doctor and Patient, New York, The Macmillan Co., 1939.

THE MANAGEMENT OF OLD CONTRACTURES OF THE HAND RESULTING FROM THIRD DEGREE BURNS

RANDOLPH JONES, JR., M.D.

Contractures of the hand and digits as a result of burns are common, and these deformities often may be corrected, with subsequent improvement in the function of the hand, by suitable operative measures. Supplementary physiotherapy directed toward early restoration of function is an invaluable adjunct to surgical treatment. Each patient presents an individual problem. It is important to estimate the depth of the scar, its attachment to the deeper structures of the hand, and possible distortion of them, before deciding on the method of repair to be used in the particular case. Although the deformity may have been present for a decade or more and may have existed during the growth period of the individual, much can be done to improve the usefulness and appearance of the member. Davis[1,2], Blair and Brown[3], and others who have obtained excellent results in treating these deformities have enumerated the principles used in their correction.

The cases with contractures of the hand presented herein fall readily into three groups. In the first are those patients having cicatrices on the palmar surfaces of the digits, which in some instances extend down on the palm itself and cause web-like flexion contractures of the fingers. These webs frequently may be released by the interposition of flaps formed by incisions made at an angle to an incision splitting the contracture itself along its leading edge, a procedure advocated by Morestin in 1914.

The scar in the second group of cases is broad, but is unattached to the deeper structures of the hand, and is best treated by excision of the cicatrix with the underlying fascia, leaving a protective layer of fat over the nerves, muscles, and tendons beneath. When the palm or the palmar surface of the finger is involved, the defect created by excision of the constricting scar may be covered with a full thickness or Wolfe Krause graft. A thick split graft may be used if the dorsum of the hand or the finger is to be covered with skin.

A representative contracture of the third type is caused by a scar which extends from the skin to the muscles, ligaments, tendons, or joints of the hand. This fibrous tissue should be stretched as much as possible by the intensive use of physiotherapy before operation. A full range of motion of the hand and fingers may follow excision of the cicatrices in many of these cases; but unless an adequate fat pad is interposed between the skin and the deeper structures, the constricting scar will in time re-form and the result will be unsatisfactory. Elastic traction and other physiotherapeutic measures

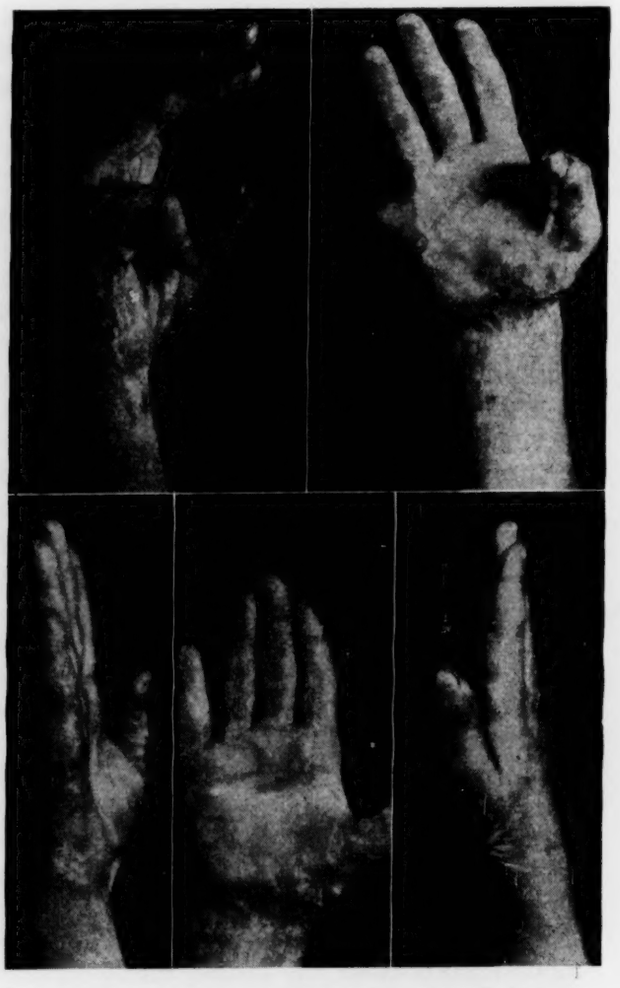

Fig. I. Contractures of the thumb and small finger resulting from a burn received 2½ years previously. These were released by the interposition of flaps formed by incisions made at an angle to the long axis of the web after the latter had been incised. The lower photographs were taken 5½ months after operation.

From the Department of Surgery, Duke University School of Medicine, Durham, N. C. Read before the Section on Surgery, Medical Society of the State of North Carolina, Bermuda Cruise, May 13, 1939.

1. Davis, John S.: The Use of Free Grafts of Whole Thickness Skin for the Relief of Contractures, Surg., Gynec., and Obst. 25:1, 1917.
2. Davis, John S.: Plastic Surgery, Its Principles and Practice, Philadelphia, P. Blakiston's Sons and Co., 1919.
3. Blair, V. P., and Brown, J. B.: The Use and Uses of Large Split Skin Grafts of Intermediate Thickness, Surg., Gynec., and Obst. 49:82, 1929.

are of great assistance in obtaining early return of function after operation.

The first group of cases mentioned above is exemplified by the patient's hand shown in Figure 1. This white girl, seven years of age, burned her right hand severely when she fell in an open fire two and one-half years before. Although the skin healed satisfactorily, the scars on the palmar aspects of the thumb and small finger had caused the flexion contractures visible in the photographs taken when she was admitted to the hospital. These were released by the interposition of flaps formed by suitable incisions on the sides of the webs. A satisfactory functional and cosmetic result was obtained.

Examples of the second group of broad contracted scars are the patient's hands shown in Figure 2. The left hand of this eleven year old boy had been burned ten years before when he fell against a hot stove. Subsequent scarring and contracture had prevented full extension of the fingers. The scar, which extended down to the palmar fascia, was completely removed, leaving a pad of fat overlying the deeper structures of the palm, upon which the full thickness graft took with an excellent functional result. Brown[3] has shown that when the scar is on the dorsum of the hand, durable skin may be obtained by using a thick split graft in this location.

Fig. II. The palmar scar shown above followed a burn received when the patient fell against a hot stove 9 years before. The scar was excised, allowing the palm to return to approximately normal size. The full thickness graft used to cover the defect following excision of the scar has become a satisfactory palmar skin.

A contracture of the third group listed above is shown in Figure 3. At times the puckering of the scar, the limitation of motion present, and the duration of the contractures will produce a definite impression that the deeper structures are adherent to the skin cicatrix. When these findings are present, preparations can be made to place the hand beneath an abdominal flap of skin and sub-cutaneous fat, or to raise a tube flap if this is thought best. At other times, however, the operator may plan to cover the defect left by excision of a palmar contracture with a full thickness graft, but may at operation find that the scar is deeper than first estimated and that the flexor tendons and the carpal ligaments are exposed after the removal of the cicatrix.

A situation of this kind was encountered at operation on this patient's hand shown in Figure 3. In order to provide the necessary palmar skin and to cover the flexor tendons and the transverse carpal ligament with fat, the defect was filled with a pedicle flap raised from the abdominal wall. The area from which the flap had been taken was covered at the same time with a Thiersch graft. By this means the cushion of fat necessary to maintain normal tendon function was obtained, and a deformity which had been present for fourteen years was effectively corrected.

A pedicle or tube flap with its subcutaneous fat may prove the only means of releasing a contracture which other measures have failed to relieve. An illustration of this was seen in the treatment of the deformed hand shown in Figure 4. Two operations elsewhere had failed to release the contracted fingers, and although some improvement followed the interposition of angle flaps along the contracture combined with the application of palmar full thickness grafts, it was necessary eventually to transplant a tube flap to the palm and fingers before a full range of motion could be obtained.

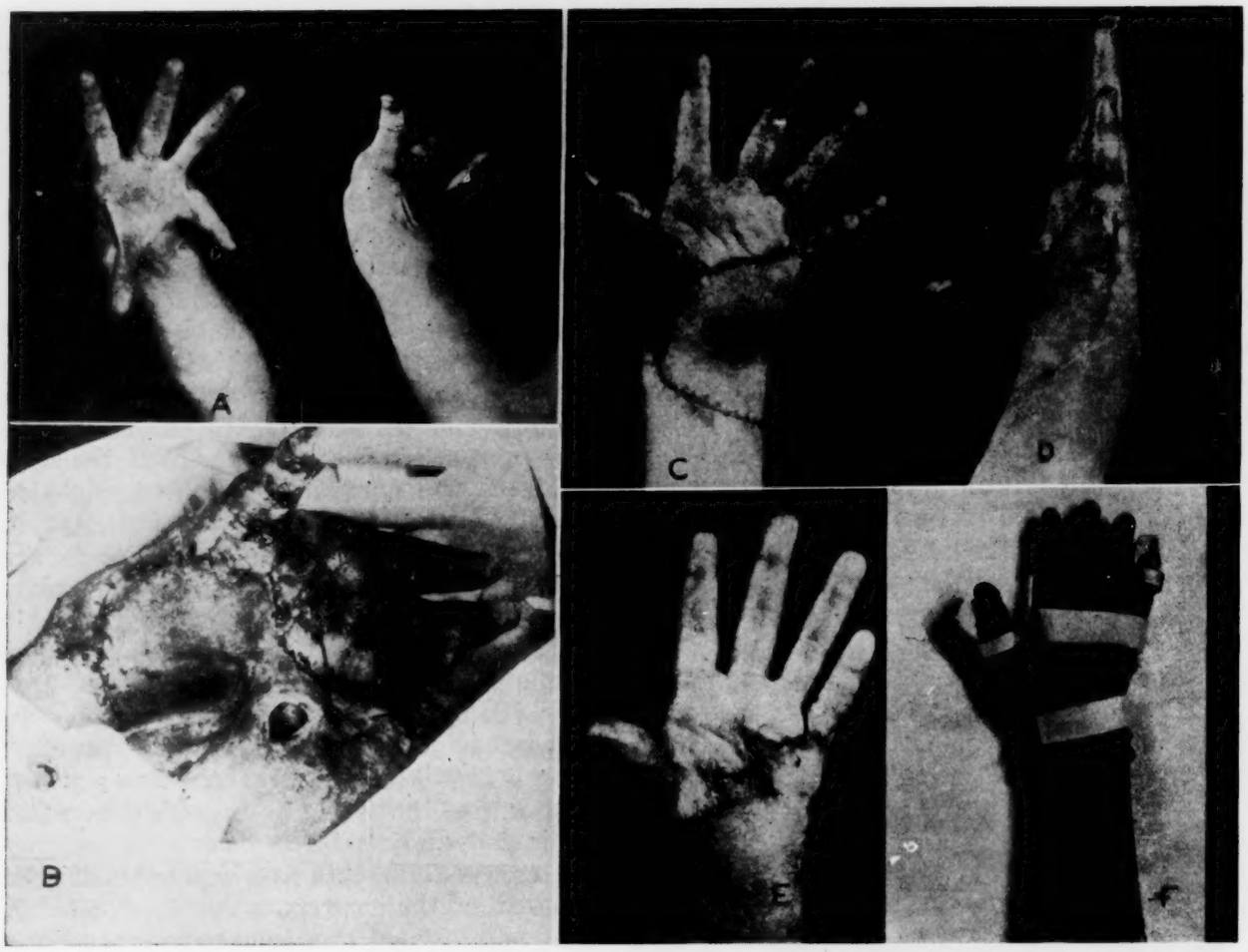

Fig. III. A. Contractures of the thumb and small finger of 14 years' duration. B. The scar tissue has been excised and the palmar defect covered with a pedicle flap which is still attached to the abdominal wall. C. and D. Hand, shortly after division of the abdominal pedicle flap. E. Hand after the transverse scar across the palm had been lengthened. F. Splint to be worn at night for six months.

About the periphery of extensive scars there are often one or more band or web-like contractures. Release of these by the interposition of angle flaps usually makes the correction of the main scarred area easier, and results in more normal tension after the deep cicatrix has been excised. The web at the wrist shown in Figure 5 was released in this manner, and the palm reconstructed by a tube flap from the abdominal wall.

The third type of contracture may be associated with damaged tendons or nerves and with some bone deformity. Kanavel,[4] Bunnell,[5] Mason,[6] Meyer,[7] and Koch[8] have stated the principles to be followed in the management of these complicated problems, and a discussion of this type of case is beyond the scope of this paper. Nevertheless, too much emphasis cannot be placed on preventing skin contractures following third degree burns by early restoration of the skin loss and early resumption of function. When the hand is involved, the "thick split" graft of Blair and Brown[3] answers this need better than any means yet devised.

In the management of old contractures proper physiotherapy and splinting, with the use of elastic traction in cases of long standing, are of greatest assistance in obtaining an adequate return of function. In the majority of the cases presented herein it was found advisable for a splint to be worn at night for six months, maintaining and increasing the reduction of the contracture secured at operation. Gentle massage of a bland ointment into the scars for two to three months after operation increases their later pliability.

4. Kanavel, Allen B.: Infections of the Hand, ed. 6, Philadelphia, Lea and Febiger, 1933.
5. Bunnell, Sterling: The Surgery of Tendons, in Lewis: Practice of Surgery, Hagerstown, Md., W. F. Prior Co., Inc., 1930, vol. 6.
6. Mason, M. L.: Immediate and Delayed Tendon Repair, Surg., Gynec., and Obst. 62:449, 1936.
7. Meyer, L., Ransohoff, N. S.: Contribution to Physiological Method of Repair of Damaged Finger Tendons; Preliminary Report on Reconstruction of Destroyed Tendon Sheath, Am. J. Surg. 31:56, 1936.
8. Koch, S. L. and Mason, M. L.: Purposeful Splinting Following Injuries of the Hand, Surg., Gynec., and Obst., 68:1, 1939.

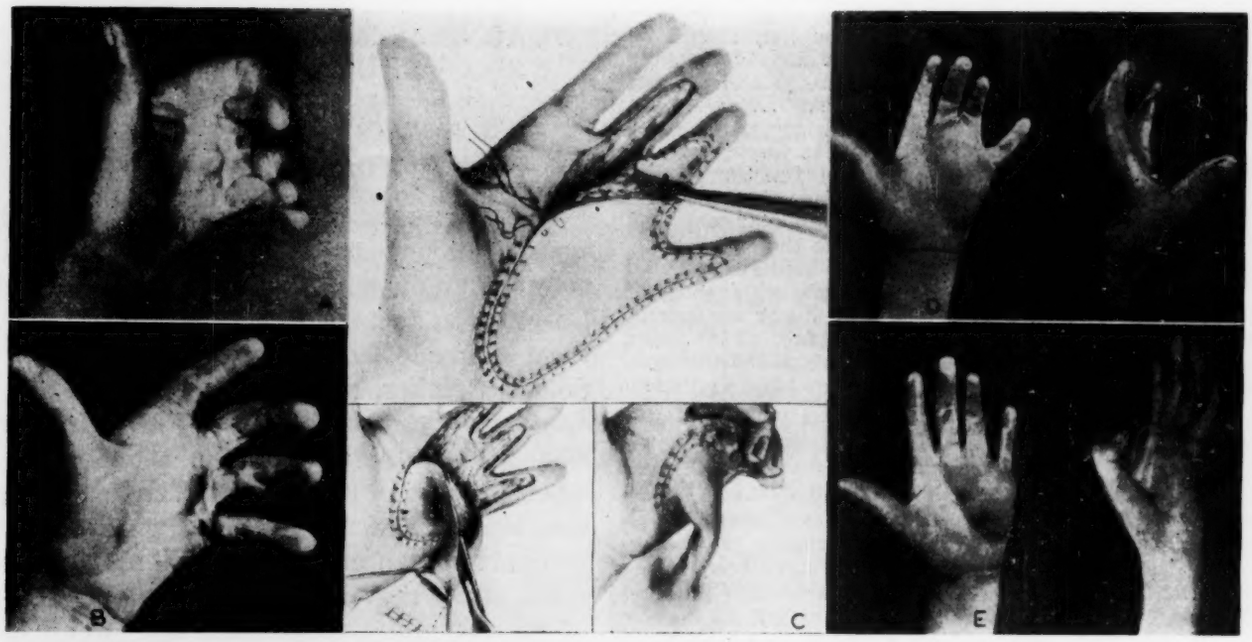

Fig. IV. A. A scar of the palm and the palmar surfaces of the fingers 5 years after a burn. B. Partial relaxation has been obtained by the interposition of skin flaps and the transplantation of several small full thickness grafts. C. Transplantation of a tube flap from the abdominal wall to the palm, after the palmar scars had been excised. D. Hand shortly after and (E.) two years after transplantation of tube flap.

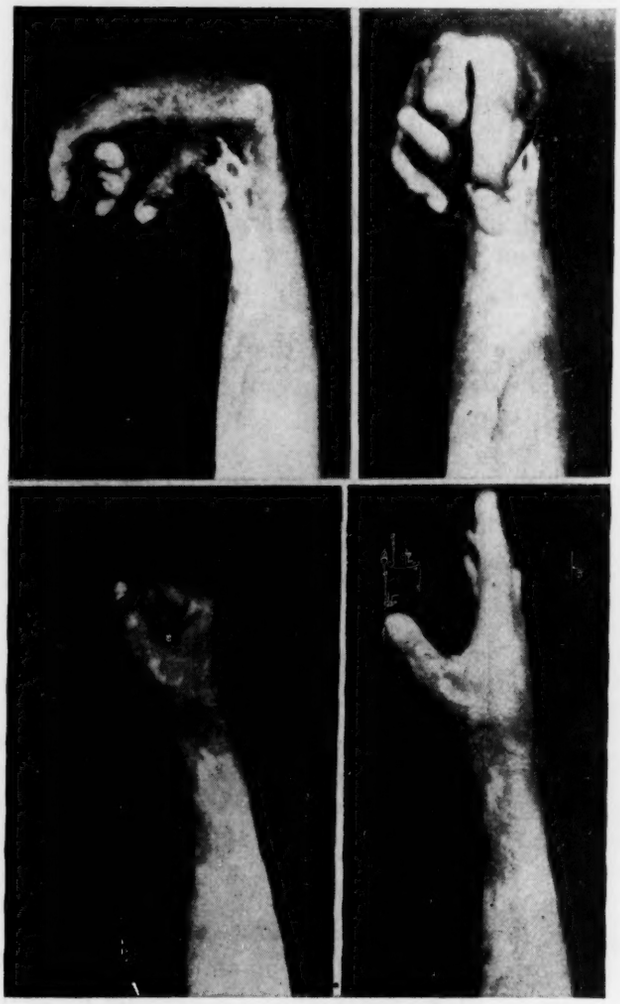

Fig. V. A contracture of the palm and wrist of 11 years' duration. This was released by transplantation of a tube flap to the palm and the interposition of flaps of skin along the web. The lower photograph shows the hand 3 months after correction of the deformity.

Abstract of Discussion

DR. J. L. WINSTEAD (Greenville): Dr. Jones has told you how to treat contractures of the hand. I shall attempt to tell you how to prevent them.

Severe and untreated acute infections in the hand result in contractures with deformity and disability. Kanaval has shown that infection spreads along the blood vessels and nerves. The resulting scar tissue compresses the blood vessels, nerves and lymphatics, causing trophic changes. Joints are ankylosed, muscles contracted, and tendons destroyed or disabled by adhesions.

The pathological picture is one of destruction of blood and nerve supply with massive connective-tissue contraction about structures that have a most delicate function. Much can be done by prophylactic measures and active treatment to preserve and restore function. We should constantly bear in mind that we are not only attempting to overcome infection but also to preserve function. Most hand infections can be prevented by the administration of proper treatment immediately to injured hands. Sometimes a most serious infection will follow a slight injury because the injury received no treatment, or inadequate treatment. The staphylococcus is the organism in most hand infections. The streptococcus comes next in frequency, and usually causes a very rapid, severe inflammation with a marked tendency to spread to various spaces in the hand and to the forearm. The anemic, undernourished, or run-down individual is far more prone to infections.

When infection does occur, hot moist dressings continuously applied for twenty-four to forty-eight hours with complete rest will often abort it.

Hand infections are serious from their inception and demand proper diagnosis of the type and nature of the infection.

When pus appears, its exact location should be determined. The abscess should be incised properly in order to establish adequate drainage and yet not spread the infection to other spaces. In severe infections of the hand where stiffening and loss of function is impending it is of great importance to splint the hand in the "position of function"—that is, forty-five degrees dorsal flexion of the wrist. The phalanges at the metacarpo-phalangeal and phalangeal joints should be flexed to the same angle, and, most important, the thumb should be abducted from the palm, adducted toward the ulnar side of the hand, and rotated so that the flexor surface of the thumb is opposite the flexor surface of the index finger. This position should be maintained throughout the treatment except when the hand is undergoing physiotherapy.

DR. PARKER C. HARDIN (Monroe): I noted that Dr. Jones based his discussion on the fact that most of these cases follow burns—old neglected burns. For some time I have been interested in the question of the healing of burns in relation to the necessity of skin grafting, and have been trying to find out just exactly the amount of skin grafting necessary following the various types of therapy in major burns. We can, by studying the results in the different methods, find out those in which most skin grafting is required. We can look forward to the time when we can eventually choose for various burns the method which will lead to the least amount of scarring.

With contractures resulting from a burn it is wise to resort to skin grafting as soon as the wound is in condition to do so.

DR. RANDOLPH JONES, JR. (Durham): I endorse most heartily Dr. Winstead's emphasis upon the necessity of treating any infection that is present in the hand. Infection that is present even in burns should be treated intensely.

If any method is used in which coagulum forms over a third degree burn much is to be gained by moving that coagulum as early as separation begins.

Urinalysis.—The methods for the examination of the urine are taught much as they were two decades and more ago. Certain tests, such as urea determinations, have been discarded and others are regarded as having a different significance, but the records still show the color, specific gravity, reaction, albumin and sugar content, and the microscopic examination of the sediment. These simple observations, correctly used and interpreted, are practically all that is necessary in cases of nephritis. —Francis W. Peabody: Doctor and Patient, New York, The Macmilan Co., 1939.

Laboratory Procedures.—What is really needed in the application of laboratory methods to the practice of medicine is not a knowledge of more technical procedures, but a much more exact knowledge of a few. If every physician was so much at home with the technique of the simpler tests that it was quicker for him to apply them than to wonder whether they were worth while applying, and if he understood how to interpret these tests and gain the maximum information from them, the problem of the relation of the physician to the laboratory would be largely settled.—Francis W. Peabody: Doctor and Patient, New York, The Macmillan Co., 1939.

DIAGNOSIS AND TREATMENT OF NEUROSYPHILIS

J. P. DAVIS, M. D.

WINSTON-SALEM

The proper management of patients with syphilis in private practice depends fundamentally on an early and accurate diagnosis. Despite the facts which have been derived from valuable experience by such men as Stokes, Grinker, Nonne and others, the early diagnosis of neurosyphilis very often is overlooked. Failure to diagnose neurosyphilis, when present in its early or incipient stage, may be as serious in its consequences as not recognizing cancer in its treatable stage. So much of the responsibility for the prevention of neurosyphilis rests upon the practicing physician that its diagnosis and treatment deserve more widespread discussion.

The incidence of neurosyphilis has been set at varying percentages. Stokes[1] estimates that 10 per cent of a general hospital population is syphilitic, of which between 60 and 70 per cent show evidence of neurosyphilis on complete examination. The proportion of 6 to 7 per cent of a general hospital population having syphilis of the central nervous system may appear high to many of us; but may the answer not be that we do not always recognize it?

A fact which is not generally appreciated by many of us who do general practice is that syphilis invades the nervous system long before symptoms appear. Stokes and McFarland[2] reported the results of routine spinal fluid studies on 114 early secondary untreated cases. Thirty-seven per cent showed abnormal spinal fluids, as indicated by a marked increase in cell count or a positive Wasserman reaction. Only 16 per cent revealed any symptoms of neurosyphilis, and none showed abnormal neurological signs. In patients who had received treatment the percentage of abnormal spinal fluid findings was lower. In a florid syphilitic infection the earlier the spinal fluid is examined, and the less treated the case, the higher the findings of meningeal involvement. About one-fourth of all early syphilis may be expected

Read before the Section on the Practice of Medicine, Medical Society of the State of North Carolina, Bermuda Cruise, May 13, 1939.

1. Stokes, J. H.: Modern Clinical Syphilology, Philadelphia, W. B. Saunders Co., 1928, p. 902.
2. Ibid, p. 522.

to have neurosyphilis as an integral part of the clinical picture.

The practitioner is usually unable to detect any abnormal symptoms and signs, because most patients are entirely asymptomatic in the early stages of involvement. For this reason pathologic changes can only be detected by spinal fluid examination. Early changes in the nervous system are irritative, actually a meningeal reaction, and are thus devoid of marked signs or symptoms. The later changes which we detect when the pupils are fixed, the gait is affected, or the mental reactions are abnormal, represent a permanent damage or scarring of nervous tissues by the spirochetes.

The spinal fluid in early cases of meningeal involvement passes through a rather typical series of changes. The first warning of any trouble present is an increase in cell count and globulin content, representing purely a meningeal reaction. Later, as parenchymatous changes occur, serological reactions become positive. The spinal fluid serology is not likely to become positive until the infection is well established, which may be as long as one or two years after beginning invasion. The colloidal gold reaction appears only when the process is fully developed, representing a severe neurosyphilis.

The diagnosis of neurosyphilis in an early stage, aside from the study of the spinal fluid, depends more upon subjective symptoms than upon physical signs. The symptoms are likely to be vague and easily mistaken for one of many benign conditions. Generally, they are the symptoms of a mild meningeal irritation or an encephalitic involvement.

Headache is an almost constant early complaint. A persistent headache in a known syphilitic should always prompt a lumbar puncture and, when encountered in a new patient, should lead to blood and spinal fluid studies. Other early symptoms which should create suspicion and demand a spinal fluid examination are vertigo, nausea, vomiting, failing vision, diploplia, tinnitus, neurasthenia and mental confusion.

While we are largely dependent upon symptomatology and spinal fluid changes for the diagnosis of early syphilis of the nervous system, definite neurological and mental signs usually are at hand to help in the detection of late neurosyphilis, owing to permanent and often irreversible pathologic changes in the central nervous tissue. Pathologists have, for the sake of convenience, classified neurosyphilis according to the location of its pathologic process. *First*, meningeal, which designates the pathology of early neurosyphilis, both with and without symptoms. *Second*, cerebro-vascular, as represented clinically by aphasia and paralyses. *Third*, parenchymatous, characterized by destruction of nerve cells of the cerebral cortex and posterior spinal ganglia, producing the clinical pictures of paresis or tabes-dorsalis. The *fourth* classification represents variable combinations of the above three — for instance, meningo-vascular or meningo-vascular-parenchymatous — which are clinically called cerebro-spinal syphilis.

The symptomatology of neurosyphilis does not always correspond with this pathological classification, because many important symptoms may be common to more than one type. Therefore, for clarity, it is best to discuss the symptoms of neurosyphilis in general.

Headache, as in early neurosyphilis, is likewise common in late neurosyphilis. It is usually boring and severe, often worse at nights, either generalized or localized deep in the eyes, and at times associated with dizziness and vomiting.

Convulsive seizures are common in cerebro-spinal and paretic syphilis, and rarely may appear within a few months after infection in precocious cases. They may range from generalized convulsions and Jacksonian seizures to petit mal attacks with preservation of consciousness. No epilepsy should be branded "essential" without a spinal fluid study.

Personality changes and neurasthenic symptoms should always be considered as possible prodromes of cerebral syphilis. The distinction from true neurasthenia may be hard to draw and, considering the large number of neurasthenics in private practice, it would be unwise to perform spinal punctures on them all. Yet, because of the seriousness of allowing early paresis to progress untreated, every patient with a nervous breakdown in middle life should have a careful history, thorough physical and neurological examination and blood serology test. Often neurasthenic syndromes are labeled as "overwork," "nervous breakdown", or simply as a "neurosis", whereas a complete physical examination may reveal a sluggish pupil, an

optic neuritis or a positive blood serology. After a thorough study of the neurasthenic has been made and no economic, social or spiritual cause is uncovered, or if the history or examination suggests syphilis, a spinal fluid examination is then indicated.

Personality changes, or what has been termed a "conduct slump", may precede by months or years the ultimate dementia or paresis. Egotism, expansiveness, carelessness of appearance, speculative spending and change from conservatism to radicalism are characteristic of the paretic but may be overlooked due to their insidious appearance. Sexual laxity, persecutory ideas, depression, exaltation, or violence may make paresis simulate almost any major psychosis. Speech disorders, especially a slurring of words or transient aphasia, often are the first recognized signs of paresis.

Sharp, stabbing, lightning-like pains are a common symptom in neurosyphilis. They may follow the spinal nerves or may be spot-like, hitting in succession several parts of the body. "Rheumatism" is too often the diagnosis which is made to cover this symptom. Fleeting sensations of burning, tingling and numbness may shift from place to place. Transient parasthesias are always suggestive of neurosyphilis. One of the first warnings of tabetic neurosyphilis is loss of bladder control. Owing to impairment of innervation, the bladder musculature becomes atonic and dilated, resulting in retention, overflow, and "dribbling". Oftentimes these symptoms are wrongly blamed on an enlarged prostate. Disappearance of libido occurs in about 30 per cent of cases of neurosyphilis.

Syphilitic meningitis, through damage to the cranial nerves, gives rise to eye symptoms and signs. Ptosis of one lid, diplopia and strabismus are not uncommon findings. Failing vision often results from primary optic atrophy, which should be determined by ophthalmoscopic and perimetric examinations. Is the Argyle-Robertson pupil absolutely diagnostic of neurosyphilis? Nonne concludes that a pupil which is fixed to light but reacts to accommodation points to syphilis in nearly every case. Though there may rarely be other causes than neurosyphilis, finding of such a pupil absolutely indicates serologic and spinal fluid studies.

In the diagnosis of early neurosyphilis there are certain objective signs which are valuable. Sensory changes, especially analgesia to pin-prick, impairment of vibratory sense, and loss of the sense of motion and position are often the earliest warnings of sensory root involvement. As the sensory roots become more injured the advanced tabetic is produced, with a positive Romberg test, slap-foot gait, and absent tendon reflexes. Hemiparesis, spastic gait, ankle clonus, positive Babinski, and hyper-active reflexes may indicate a syphilitic process of the brain or spinal cord.

Just how reliable are the blood and spinal fluid serological reactions in the diagnosis of neurosyphilis? The blood serology is estimated by various syphilologists as being positive in only 50 to 60 per cent of tabetics; but in paresis it is usually accepted as positive in 90 to 100 per cent. Although a positive spinal fluid serology is to be expected in 100 per cent of paretics, negative results are occasionally found in cases of meningeal, vascular and gummatous neurosyphilis.

The colloidal tests are not as valuable for diagnosis as they are for prognosis. A first zone, or so-called "paretic curve", is not pathognomonic of paresis. The diagnosis of neurosyphilis depends, therefore, not on any one single finding, but must be made from the history, clinical findings, blood and spinal fluid serology, colloidal test and cell count.

Treatment

The treatment of neurosyphilis is still in a state of change and development. Syphilologists who report on the results of treatment of large groups of clinic patients show varying, and even contradictory results. Not all workers agree on the relative values of the various forms of therapy in common use. It is, therefore, impossible to present all the forms of treatment which have been and are being employed in treating the various phases of the disease. In appraising the results of treatment of syphilis of the nervous system, it is well to use the accepted pathological classification.

First, in *asymptomatic neurosyphilis* the results of treatment depend on the severity of the spinal fluid reaction. The Cooperative Clinical Group[3] reports a reversal of the milder types of spinal fluids to negative in 84 per cent of cases, while in those cases with a first zone curve only 45 per cent were reverted to negative, remaining negative for ten years or more. Routine treatment con-

sisted of intensive use of arsphenamine and bismuth or mercury. In those cases which were resistant to routine therapy, tryparsamide, therapeutic malaria, or intraspinal therapy was used. Each of these three additional methods resulted in a reversal of spinal fluids in from 25 to 75 per cent of cases resistant to chemotherapy.

Secondly, in *early meningeal neurosyphilis*, Stokes and Shaffer[4] urge intensive treatment with arsphenamine and a heavy metal, with longer courses of the former and no rest periods. They obtained good results clinically and serologically in 91 per cent of cases. O'Leary[5] treats those of this group who have paretic curves by supplementing the chemotherapy with malarial therapy.

Thirdly, in *vascular neurosyphilis* results of treatment are discouraging. Stokes and Shaffer obtained good results in only 38 per cent of treated cases. The prolonged use of neoarsphenamine, heavy metals and iodides is recommended. Tryparsamide has produced favorable results, though it is stated that malarial therapy is hazardous for these patients.

Fourth, *late meningo-vascular syphilis* responds comparatively well to therapy, as shown by Moore[6] who treated 88 cases at Johns Hopkins Hospital. Good results, clinically and serologically were obtained in 62 per cent of cases. Tryparsamide, heavy metals and iodides are used in this type of the disease. Malarial therapy is of considerable use in those cases resistant to chemotherapy, and intra-spinal treatment was at one time being widely used.

Fifth, the results of treatment of *tabes dorsalis* are difficult to appraise, because the symptoms are so multiform, and clinical improvement does not parallel serologic improvement. O'Leary[7] reports a series of 630 cases of tabes. Chemotherapy, consisting of tryparsamide, bismuth and iodides, produced serologic reversals in 64 per cent and excellent clinical results in only 26 per cent. Malarial therapy arrested clinically 26 per cent of those cases in which routine treatment had failed, especially in cases of gastric crises, lightning pains and optic atrophy. Fordyce[8] reported excellent results in 50 per cent of tabetics treated by the Swift-Ellis intraspinal method.

Sixth, *paresis* shows little response to arsphenamine, bismuth, or mercury when used alone. Moore[9] obtained good clinical results in 57 per cent of early paresis treated by tryparsamide, though only 28 per cent showed a good serological result. Among the more advanced institutional cases malarial therapy, followed by tryparsamide courses, causes complete remissions in about 35 per cent of cases and partial remission in about 30 per cent. Wagner von Jauregg[10] states that if only early cases of paresis are treated, malaria will give 100 per cent good results. Malarial therapy is undoubtedly of more value in cases in which there are no clinical signs of paresis, but in which a paretic spinal fluid persists in spite of intensive chemotherapy. Malarial therapy can, therefore, be regarded as of great value in the prevention of clinical paresis. The production of febrile reactions by means of typhoid vaccines is useful.

A few words regarding the action of tryparsamide are in order. This drug has been shown not to be spirillicidal, therefore having no field of use in early syphilis. Its exact action is not known; it is thought to stimulate the immunity and resistance factors of the body. Stokes[11] thinks it penetrates nerve tissue. Tryparsamide is valuable in the treatment of paresis, tabes dorsalis, meningeal neurosyphilis and meningo-vascular neurosyphilis. It has special merit in the treatment of late neurosyphilis following or accompanying malarial therapy. It is now believed that, in order to accomplish as much serologic as clinical improvement, mercury or bismuth, iodides, or even arsphenamine, should be given also. The average dose of tryparsamide is about 3 Gm. in 10 cc. of sterile, distilled water, given at weekly intervals for eight to sixteen weeks, followed by a rest period of four to six weeks. Many

3. O'Leary, P. A.; Cole, H. N.; Moore, J. E.; Stokes, J. H.; Wile, U. J.; Parran, Thomas; Vonderlehr, R. A.; Usilton, Lida J.: Cooperative Clinical Studies in the Treatment of Syphilis: Asymptomatic Neurosyphilis, Ven. Dis. Inform. 18:45 (March) 1937.
4. Stokes, J. H., and Schaffer, L. W.: Syphilis, J. A. M. A., 83: 1826, 1924; ibid., 85: 1271, 1925.
5. O'Leary, P. A., and Welsh, A. L.: The Treatment of Neurosyphilis with Malaria, Observations on 984 Cases in the Last Nine Years, J. A. M. A. 101: 498-501 (Aug. 12) 1933.
6. Moore, J. E.: The Modern Treatment of Syphilis, Baltimore, C. C. Thomas, 1933.
7. O'Leary, P. A.: Present Day Status of the Treatment of Neurosyphilis, J. A. M. A. 109: 1163-1166 (Oct. 9) 1937.
8. Fordyce, J. A.: Syphilis, Brit. Jour. Dermat., 36: 47, 1924.
9. Moore, J. E.: The Modern Treatment of Syphilis, Baltimore, C. C. Thomas, 1933.
10. Wagner von Jauregg, Julius: Ueber die Einwirkung der Malaria auf die progressive Paralyse, Psychiat-neuroe. Wchnschr. 20: 132-134 (Aug. 31) 1918.
11. Stokes, J. H.: Modern Clinical Syphilology, Philadelphia, W. B. Saunders Co., 1928, p. 131.

such courses may be necessary. During tryparsamide therapy, any subjective ocular symptoms should prompt careful study of the visual fields.

How long should the treatment of neurosyphilis be continued? Some specialists attempt to treat their patients for one year after the blood and spinal fluid have become and remained completely negative. But, may not this attitude at times overlook the welfare of the patient in an attempt to combat the disease? The primary aim of treatment in neurosyphilis is to restore the patient to a state of physical and mental well-being, and to maintain this state as permanently as possible. Ordinarily, continuation of treatment for a reasonable time after the patient is clinically well, in order to keep the spinal fluid negative is wise practice. However, it is not within the aim of treatment to reverse a spinal fluid serology at the expense of the rest of the man. The undoubted answer is that careful individualization of each patient should be observed. His age, life expectancy, his work, his desires are as much a part of the handling of his individual case as are his symptoms or his positive spinal fluid serology.

From the above principles of diagnosis, methods of therapy, and results of treatment we may conclude the following: The earlier neurosyphilis is diagnosed and adequately treated, the more favorable will be the outlook for the patient.

A PRELIMINARY REPORT OF AN ANALYSIS OF THE DEATHS AMONG INDIVIDUALS WITH SYPHILIS IN NORTH CAROLINA DURING 1938

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North Carolina State Board of Health

The determination of the actual mortality rate for syphilis is practically impossible from data available on death certificates. This in a large measure is due to the protean nature of the disease, which causes it to present such varied clinical pictures that it is able to masquerade as many other diseases. Even when syphilis is recognized its actual relationship to death may remain undiscovered. For example, the report of the Register-General of Great Britain in 1915 placed syphilis as the tenth among killing infections; however, Osler upon analyzing the report found that syphilis actually ranked first. His deduction was reached by estimating 18.4 per cent of all central nervous system deaths and 13.4 per cent of all cardiovascular deaths as caused by syphilis[1]. Diseases of these two structures are responsible for the majority of syphilitic deaths.

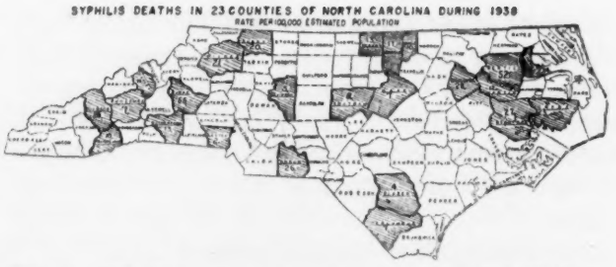

Fig. 1. Shaded areas represent health jurisdictions cooperating in study. Morbidity rates among syphilitics per 100,000 of general population are indicated for each area studied.

The material used in this study was collected through the cooperation of twenty-four health departments of this state. As seen in Figure 1, the distribution included representative areas of the state. Each death which occurred in these areas during 1938 was investigated for the presence or absence of syphilis by the health officer. The investigation was confined to the examination of laboratory and medical records and, in certain cases, an interview with the private physician who took care of the patient. It consisted of 176 cases; 41 per cent were white and 59 per cent colored. The sex was also about equally divided; 59 per cent were males and 41 per cent females. Slightly more than half of the cases were under thirty years of age.

In this study the death rate among syphilitics from all causes was 16.1 per 100,000 of the population. It is obvious from Figure 1 that marked variations existed in this rate. This death rate fluctuated in these various health jurisdictions from 2 to 65 per 100,000 population. Among the factors responsible for this marked variation were the location of the state institution for the insane, the availability of medical and laboratory data, and the enthusiasm of the investigator to "ferret out" syphilis.

Read before the Second General Session of the Medical Society of the State of North Carolina, Bermuda Cruise, May 13, 1939.

1. Moore, J. E.: The Modern Treatment of Syphilis, Charles C. Thomas, published 1938.

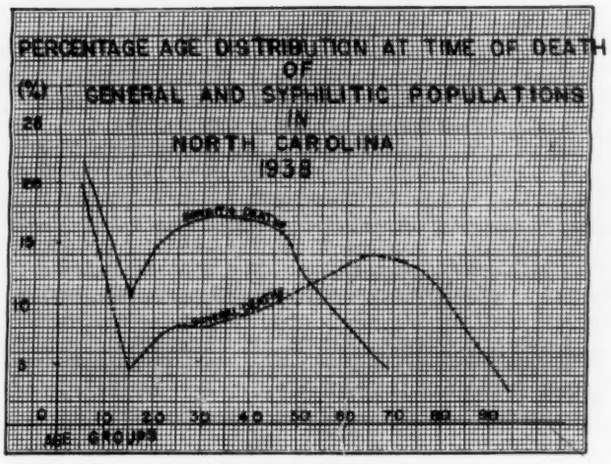

Fig. 2

DEATHS FROM ALL CAUSES IN NORTH CAROLINA

Age by Years	*Among the General Population*		*Among the Population With Syphilis*	
	Number	*Percent.*	*Number*	*Percent.*
0-9	7,227	20.0	36	20.2
10-19	1,621	4.5	15	8.5
20-29	2,954	8.2	33	18.8
30-39	3,065	8.6	28	16.1
40-49	3,583	10	29	16.5
50-59	4,353	12.1	19	10.8
60-69	4,944	13.8	12	6.8
70-79	4,608	12.8	4	2.3
80-89	2,723	7.6		
90+	820	2.3		
TOTAL	35,898	100.0	176	100.0

Figure 2 shows the age distribution of deaths among syphilitics as compared with those among the general population of North Carolina. Over half of these syphilitics were dead before they reached thirty years of age, whereas, among the general population, one-half are dead by forty-five years of age. Because an occasional patient reached seventy, the average age at death of these patients with syphilis was thirty-eight years as compared with fifty years for the general population; thus, the lives of these individuals with syphilis were shortened about 24 per cent.

The fatality rate at each age of life up to fifty is consistently higher for a given syphilitic population than for the general population (Fig. 2). None of the individuals in this study survived beyond seventy; whereas, among the general population, 22.7 per cent survived beyond this age limit.

It is appreciated that the age distribution of mortality among the syphilitics in this study is biased by the fact that detectable syphilis is largely dependent upon finding a positive Wassermann reaction. In addition, the older the population groups studied beyond the peak incidence of the disease, the

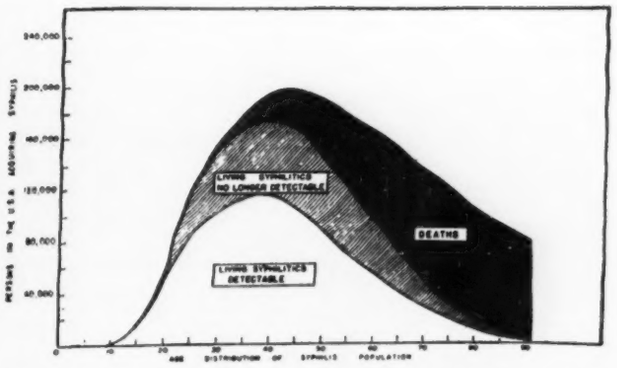

Fig. 3. Age distribution of all people in a given population who have ever had syphilis separated according to whether they had detectable syphilis (i. e. positive Wassermann), non-detectable syphilis (i. e. negative Wassermann) or whether they were dead. By permission from Vonderlehr and Usilton of U. S. P. H. S.

less likely one is to find detectable syphilis by the Wassermann test. This decrease in detectable syphilis is, of course, due to reversals of the Wassermann test either spontaneously or as a result of treatment. As was shown (Fig. 3) by Vonderlehr and Usilton[2], approximately one-third of the total syphilitic population have a negative Wassermann by the age of forty. This becomes of paramount importance to the physician when it is appreciated that 23.8 per cent of individuals dying of cardiovascular syphilis had a negative Wassermann in a series studied by Reid[3] of Boston. Had all the deaths among syphilitics been included in this study, it is very likely that the mean age at death would have approached closer the death rate of the general population.

Based upon the observed fact that the average syphilitic acquired his disease at about twenty-two years of age, from this study it may be deduced that a person with syphilis lives approximately sixteen years after the onset of his infection.

An analysis of the cause of deaths among 162 of the cases reported reveals 57.5 per cent of these deaths may have been directly or indirectly due to the activity of the treponema pallidum and 42.5 per cent to other causes. (Fig. 4). Moore states that the greatest single cause of death from acquired syphilis is cardiovascular syphilis. Diseases of the circulatory system in this study accounted for 12.2 per cent of the deaths. This is approximately one-half higher than the

2. Vonderlehr, R. A. and Usilton, Lida J.: The Chance of Acquiring Syphilis and the Frequency of Its Disastrous Outcome, Venereal Disease Information 19:396, 1938.
3. Reid, W. D.: The Diagnosis of Cardiovascular Syphilis. Analysis of Clinical and Postmortem Findings, Am. Heart J. 6:91, 1938.

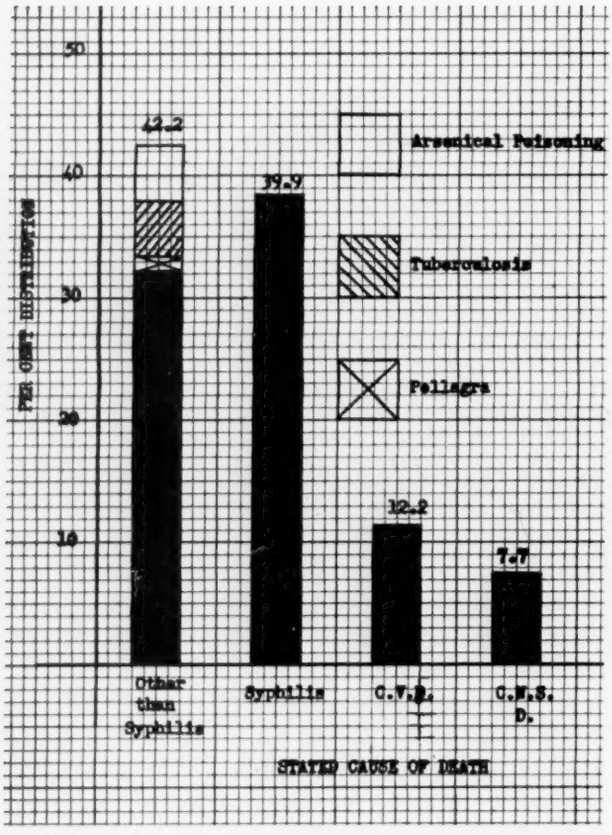

Fig. 4

DISTRIBUTION OF 162 DEATHS AMONG SYPHILITICS ACCORDING TO THE STATED CAUSE OF DEATH

Stated Cause of Death	*Deaths Among Syphilitics* Number	Percent.
Other than Syphilis	52	32.1
Arsenical Poisoning	7	4.3
Tuberculosis	8	4.9
Pellagra	2	1.2
Syphilis Lesion not Stated	62	38.3
Cardiovascular Diseases	19	11.8
Central Nervous System Diseases	12	7.4
TOTAL	162	100.0

rate in the general population for this cause. Central nervous system diseases accounted for 7.7 per cent of the deaths among syphilitics.

Among 38.3 per cent of the cases in this series, syphilis was stated as the cause of death, but no clue was given as to the actual vital structure involved. In a disease which may affect every structure in the body this sort of a diagnosis allegorically suggests such a dissolution of the human body as was applied by that renowned physician-poet, Oliver Wendell Holmes to the famous "one-hoss shay." Such massive destruction of vital structures not infrequently occurs among the unborn during the last trimester of an untreated syphilitic pregnancy; however, in adults the pathological processes are exceedingly patchy—destroying areas in the aorta in some cases and certain tracts and regions of the central nervous system in others.

Among the causes of death other than those attributed to syphilis, tuberculosis and arsphenamine dermatitis were the most frequently observed. As tuberculosis and syphilis are notably diseases of the lower socio-economic levels of society, they are probably very frequently associated in the same patient; however, there are not sufficient cases available in this study to draw conclusions on this point.

Arsphenamine poisoning was indicated as responsible for 4.3 per cent of the deaths. This rate is obviously excessive when compared to that of Stokes, who has had only two arsphenamine deaths in eight years on his service in Philadelphia.

Conclusions

1. One-half of the annual deaths among syphilitics occurred before thirty years of age, as compared with forty-five years of age for the general population.

2. Lives of individuals with syphilis are shortened about 24 per cent.

3. The average patient died within sixteen years after acquiring the disease.

4. Approximately twice as many people in the syphilitic population die of cardiovascular disease as in the general population.

Laboratory and Clinician.—Much hospital laboratory work may be regarded as of indirect significance for the individual patient, but aimed at the training of better clinicians. When, as sometimes happens, it results in the production of poor clinicians, unable to interpret disease except through the eyes of the laboratory, its purpose has failed, and failed seriously.—Francis W. Peabody: Doctor and Patient, New York, The Macmillan Co., 1939.

Indiscriminate Laboratory Examinations.—In the hospital all manner of tests can readily be performed in obscure or doubtful cases, but in private practice the economic factor usually restricts one to the tests which most obviously offer practical assistance. Fortunately, however—and this is apparently contrary to much present-day opinion—good medicine does not consist in the indiscriminate application of laboratory examinations to a patient, but rather in having so clear a comprehension of the probabilities and possibilities of a case as to know what tests may be expected to give information of value.—Francis W. Peabody: Doctor and Patient, New York, The Macmillan Co., 1939.

ARTIFICIAL RUPTURING OF THE MEMBRANES AS A METHOD OF INDUCTION OF LABOR

JOHN C. TAYLOE, M.D.

WASHINGTON, N. C.

This is not a new method of induction of labor; for, on reviewing obstetrical literature, we find that this method was first used in 1756, by an English mid-wife, Mary Donally, who achieved the delivery of a live baby from a mother with a contracted pelvis who had previously been delivered of two full term, still-born babies. Also, in 1783, the first physician to perform this simple operation was a Dr. Maculay, who ruptured the membranes on a similar case, and achieved the birth of a live baby from a mother with a similar history.

At the present time there are two theories as to what causes the dilatation of the cervix. One, the Hydrostatic Wedge Theory, states that the bag of water is the dilating agent, acting as an even dilator on the cervical canal. The other theory, advanced by Dewees in 1806, states that as the longitudinal muscle in the uterus contracts, the circular fibers relax and thus the cervix is dilated and pulled up over the presenting part. This theory also states that the membranes and liquor amnii act only as a lubricant and protecting agent for the baby.

Those of you who, in the past, have used bags and bougies to induce labor have found that they did not, in all cases, induce labor; that there is a higher fetal mortality connected with their use; and that the maternal morbidity is higher. Morton[1], in a study of 132 cases of bag and bougies induction at Johns Hopkins Hospital, reports a fetal mortality of 32 per cent and a febrile puerpura in 33 per cent of cases. His report has been confirmed by other physicians—among them, Moore at the Presbyterian Hospital in Charlotte.

A simple, easy and efficient method of inducing labor is by artificial rupture of the membranes. This is a valuable therapeutic procedure for several reasons:

(1) It is the easiest method. It is a very simple operation and is done without the aid of anesthetics and without special apparatus.

(2) The danger of infection is no greater than from an aseptic vaginal examination, and it has the cleansing effect of the liquor amnii afterwards as a safeguard.

(3) It is not necessary to have a foreign body (bag or bougie) in the uterus for twenty-four hours.

(4) To a certain extent it imitates nature, as it is similar to those cases which have spontaneous rupture of the membranes.

(5) It is sure to induce labor.

In introducing any therapeutic procedure it is necessary to take into consideration the indications and contraindications for its use. I have found it most useful in cases of toxemia of pregnancy which show no improvement under medical care, and those with convulsions. Other indications to its use are marginal placenta previa, post maturity, abruptio placenta, dysentery, and fibroids. I have used it also in patients with moderately contracted pelvis who had had difficult labor with full term, still born children, and in one case of habitual death of the fetus between the ninth and tenth month of pregnancy. The contraindications to this procedure have been marked contraction of the pelvis and malposition, and cases where a surgical operation has been performed on the cervix.

During the past four years this method of inducing labor was used on 59 multiparae and 52 primiparae. Of this series of 111 cases there was one maternal death in a patient with severe eclampsia who had had no prenatal care. There were five fetal deaths—four from toxemic mothers, and one a still birth from a mother who had premature separation of the placenta. Upon analysing these 111 cases we find that the latent period—the period from the time the membranes were ruptured until the labor pains started—was found to average around three and a third hours; in the primiparae the shortest time was fifteen minutes; the longest, eight and one-half hours. The average length of labor in the primiparae was ten hours and thirty-eight minutes. In the multiparae, the latent period averaged about three hours. The longest latent period in multiparae cases was twelve hours and thirty minutes; the shortest, twenty minutes. The average length of labor in the cases of multi-

Read before the Section on Gynecology and Obstetrics, Medical Society of the State of North Carolina, Bermuda Cruise, May 10, 1939.

1. Morton, D. G.: Comparison of Results Obtained in Induction of Labor by Means of Bougie and Bag, Am. J. Obst. and Gynec. (December) 1929.

parae was seven and one-half hours. The longest latent period was found in the cases that were furthest from maturity. Pituitrin in small doses was used in cases with the longest latent periods. All of these patients had their membranes ruptured in the hospital, and 95 per cent were delivered there. The other 5 per cent were allowed to go home after remaining in the hospital until labor had started and the presenting part was well down in the pelvis. Williams of Johns Hopkins, and DeLee of Chicago said that in all types of labor in a large series of cases the average length of labor for a primipara was seventeen and one-half hours, and for a multipara, thirteen hours. From statistics in my small series of cases, and from statistics reported from King[2], Broadhead, Macher, Bradford[3], Wilson[4], and Plass[5], these figures for the average time of labor in primiparae and multiparae were reduced 25 per cent, at least.

Technique: The patient is given a cleansing enema at 8:00 a. m. The pubic hair is shaved and the pubic region washed with soap and water. The pubic region and external genitalia are painted with 4 per cent mercurochrome, and one ounce of 4 per cent solution of mercurochrome is injected slowly into the vagina with a urethral syringe. The membranes are then ruptured, using aseptic technique, with a pair of long dressing forceps or any blunt instrument. The head is pushed up by the hand in the vagina, and as much of the liquor amnii is allowed to escape as will. No anesthetic is required.

The objections to this method of induction of labor have been that it causes more intracranial hemorrhages in infants, and that more damage is done to the cervix without the hydrostatic wedge, and that there is the danger of a prolapsed cord. King[2] has shown in a large series of cases that these conditions do not occur any more than if labor goes on with the membranes intact. Obstetrical morbidity is about the same as in those cases that go through labor with the membranes intact. There were no cases of infection in my small series. About 10 per cent of them ran a temperature around 100 from two to three days. Prolapse of the cord was not present in any of my cases, but one case did have a prolapsed arm on which a version and extraction was done, successfully. There were no cases of intracranial hemorrhages in my series.

Artificial rupturing of the membranes is not recommended as a routine procedure in every obstetrical case, but it is recommended as a safe, sure and efficient method of inducing labor when induction of labor is indicated.

2. King, A. G.: Cervical Dilation in Dry Labor and after Deliberate Early Rupture of the Membranes.
3. Bradford, W. Z.: Induction of Labor by Rupture of Membranes, South. Med. and Sur. (November) 1933.
4. Wilson, Leo: Induction of Labor by Rupture of the Membranes, Am. J. Obst. and Gynec., (February) 1934.
5. Plass, E. D. and Seibert, C. W.: Premature Rupture of the Membranes as a Means of Inducing Labor, Am. J. Obst. and Gynec. (November) 1936.

Discussion

DR. J. STREET BREWER (Roseboro): It is interesting to me to recall that when I was in medical school, we were taught to keep the membranes intact as long as possible because premature rupture of the membranes would slow up labor. In later years, I think we have learned that such is not the case. My experience is that labor progresses just as well after it starts when the membranes have been prematurely ruptured.

Labor should not be hard and vigorous, particularly when there is a long latent period. Labor may start with a great deal of vigor. I think if something is not done to slow down this type of labor a little you are likely to get intracranial damage. I believe a proper thing to do, in those cases where labor starts off vigorously before you have dilatation of the cervix is to give some sort of a sedative so that the pains may not be very strong and the patients will not strain in bearing down until there has been a good deal of effacement and dilatation of the cervix. In that way you lessen the trauma to the baby's head.

In that connection, I would remind you that, since most of these cases we are dealing with are premature infants, you have to be a little careful of the administration of morphine to tone down these labors. I prefer the use of the barbiturates.

Emotional Manifestation.—Although the physical manifestations of embarrassment such as blushing have long been recognized, the analogue of blushing which might be exhibited in palpitation or in spastic colitis as a result of emotional factors was overlooked. So much attention was focused upon the gastro-intestinal and circulatory tract that it was forgotten that they were parts of an individual who was perhaps expressing in this particular way and by these particular symptoms his emotional conflicts.—Winfred Overholser: The Broadening Horizons of Medicine, Science, 90: 2338 (Oct. 20) 1939.

Informing the Public. — Not only the material benefits from modern knowledge, but the science man's way of working need to be more fully understood and more widely used. Pasteur did little arguing. He presented truth and demonstrated the meaning of truth. He withheld nothing for himself. He sometimes expressed regret that so many uninformed people could not, or did not, wish to understand, but he found encouragement from those who did understand.—Caldwell, Otis W.: Some Problems of an Educated Minority, Science 89: 2322 (June 30) 1939.

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March, 1940

THE PREPARATION OF MANUSCRIPTS

With the state meeting only two months off, those who are on the program will soon be preparing their papers. In the desire to lighten our editorial task a bit and to achieve greater uniformity in future issues of the NORTH CAROLINA MEDICAL JOURNAL, we are offering in this issue a few suggestions for the preparation of a manuscript. Most of them are taken from Dr. Fishbein's book, MEDICAL WRITING, which we heartily recommend to anyone attempting to prepare a medical paper.

Manuscripts should be typed on standard size typewriter paper, double-spaced, and with liberal margins. Pages should be numbered, and part of the title should appear at the top of each page.

The full title of the paper, the author's name with his degrees (M.D. and higher degrees) and his address should be at the top of the first page. If the paper is from a medical school or hospital, the full name of the institution and the department should be given in a footnote at the bottom of the first page, along with the section and meeting to which the paper was presented, and the date of presentation. The form should follow that used by the NORTH CAROLINA MEDICAL JOURNAL.

References to books and articles, and any footnotes of the author's, should be typed, double-spaced, on a separate page at the end of the manuscript, numbered consecutively with the pages in the text. The bibliographic form and abbreviations used in the *Journal of the A. M. A.* and given in Dr. Fishbein's book should be followed exactly. Books and articles not referred to in the text should not be included, unless a complete bibliography of the subject is given.

Legends for illustrations, and tabular matter should be typed on separate sheets of paper, numbered with the text.

Except in tables, few abbreviations are permitted. When there is any doubt, it is always best to spell out terms. The sign % is used only in tables. In text matter, "per cent" is correct. The word "x-ray" is spelled with a small "x". For rules on abbreviation, spelling, and numerals in medical writing, Dr. Fishbein's book is the most authoritative source.

Case reports should be written with the same care that is given to other articles. Dr. Fishbein says: "A case report should tell its story in clear, straightforward narrative style. It should not be transcribed word for word from original records that were hastily jotted down at the time the various events occurred; the jerky, telegraphic style of the record sheet may result in actual padding." All irrelevant findings should be omitted, and the tenses should be consistent. Care should be taken to avoid confusion of dates.

When the paper has been typed, the author should re-read it carefully, checking on spelling and grammar. Corrections should be written between the lines in ink, *legibly*, if possible!

The NORTH CAROLINA MEDICAL JOURNAL, like most state journals, has been forced to adopt the policy of asking authors to pay for their illustrations. It will save expense to the author if he will omit all illustrations which do not add directly to the value of the paper. Our engraver makes his rate as reasonable as possible. If he so desire, the author will be notified as to the cost of his cuts before they are made. The statement for the cuts will be sent directly from the engraver to the author.

NORTH CAROLINA'S VITAL STATISTIC FOR 1939

The vital statistics figures for 1939, recently released by Dr. Carl V. Reynolds, are, for the most part, distinctly encouraging. The death rate for the entire population is the lowest yet recorded—9 per 1000, as compared with 9.5 in 1938. This represents a saving of 1,911 lives. The infant mortality dropped from 68.3 per 1000 live births in 1938 to 58.5 in 1939. Translated into lives, 757 more babies survived last year than in the year before. In comparing this infant mortality with that of some other states, it should be remembered that the negro population in North Carolina is 29 per cent, as compared with the national average of 10 per cent; and that the infant mortality is much higher in the colored than in the white race.

The maternal death rate per 1000 live births dropped from 5.6 to 4.8—comparing favorably with the last national rate recorded, in 1937, of 4.9. This means a saving of 67 mothers during the year.

"Last year saw the saving of 357 lives of children under 2 years of age in North Carolina from death from diarrhea and enteritis, the rate falling from 29.2 to 18.9 between 1938 and 1939."

The pneumonia death rate declined from 76.8 to 61, saving 537 lives. With the further use of sulfapyridine—released for general use last March — there should be a much greater saving of lives. An article in the *Pennsylvania Medical Journal* for February, summarizing the results in nearly 3000 reported cases treated with sulfapyridine, gives the mortality for all types and ages as only 7 per cent.

The most humiliating figures in the report record 173 deaths from diphtheria, with a rate of 4.9, as compared with 176 deaths and a rate of 5 the preceding year—a negligible decrease. It is to be hoped that the diphtheria immunization law enacted by our last legislature—thanks to our most efficient Secretary-Senator, Dr. T. W. M. Long—will do much to improve this disgraceful showing. Still more important, however, is that the family doctors and pediatricians of the state redouble their efforts to have all babies under their care immunized before they are a year old.

SULFAPYRIDINE VS. SERUM IN LOBAR PNEUMONIA

In an incredibly short time after its introduction sulfapyridine has been widely accepted as our most useful means of combatting pneumonia. The ease with which it can be administered, the fact that it is bacteriostatic for all types of the pneumococcus, its rapid action, and its relatively low danger compared with that of the disease itself, appeal both to the profession and to the public. In spite of all these advantages, however, over the greater expense and more complicated technique of type-specific serum, the latter has its strong advocates, and at times the debate becomes rather acrimonious.

Mason and Stocklen[1] have recently published the result of the fairest possible comparison of the two forms of treatment. In the Cleveland City Hospital, from February 1 to May 1, 1939, a series of 66 adult patients with lobar pneumonia were treated, giving alternate cases serum and sulfapyridine respectively, "except in some instances in which typeable pneumococci were not found in the sputum or by lung suction. The patient was then given sulfapyridine."

"Typeable pneumococci were found in 72.7 per cent of the cases. In the others, hemolytic streptococci, green streptococci, pneumococci that did not type, and mixed flora were recovered." Three cases of Type III pneumococcus were found in each group.

"Sulfapyridine was approximately twice as effective as serum in producing defervescence by crisis. In 37 per cent of the cases treated with serum, fever subsided by crisis, compared with 73 per cent in the sulfapyridine treated cases.

"Length of hospitalization was definitely shorter in the group of patients receiving sulfapyridine. Serum treated cases averaged 19.3 days in the hospital as compared with 15.9 for those treated with sulfapyridine."

The average cost of the serum used for each patient was $70.07; of the sulfapyridine, $3.03.

In the serum treated group there were six deaths—a mortality of 18.2 per cent; there were no deaths in the sulfapyridine group.

If not the first, this is certainly one of the first reports in which, under conditions as nearly as possible similar, alternate cases

1. Mason, Ulysses G. and Stocklen, Joseph B.: A Comparative Study of Serum and Sulfapyridine in the Treatment of Lobar Pneumonia, Ohio State M. J. 36:177 (Feb.) 1940.

were treated by serum and sulfapyridine. The result speaks eloquently for the efficiency of sulfapyridine.

In the *New York State Journal of Medicine* for February, Kaufman[2] reports a series of 81 cases of old age pneumonia (both lobar and broncho-) treated by sulfapyridine. The patients' ages ranged from 60 to more than 90, and the series included 13 Type III cases. There were 19 deaths in the group—a mortality of 23.5 per cent. "But it has to be considered that almost all these patients had some cardiovascular disease, that the previous death rate used to be 75 per cent, and that there was no selection of the cases." In discussing the question of serum vs. sulfapyridine, Kaufman concludes that: "If one considers the severe strain of serum therapy in old age pneumonia sulfapyridine has a wider field of application than serum therapy."

On the other hand, sulfapyridine has a disagreeable habit of producing renal calculi in a certain number of cases. Most of us, if we ourselves had pneumonia, would probably be willing to take the possible future risk of a kidney stone if thereby we could reduce by 75 per cent our chances of acquiring a tombstone. It should be remembered, however, that both sulfanilamide and sulfapyridine should be reserved for real need and not be used indiscriminately for minor ailments.

2. Kaufman, Paul: Effect and Toxic Effects of Sulfapyridine in Old Age Pneumonia, New York State J. Med. 40:204 (Feb. 1) 1940.

* * * *

THE "COMMON COLD"

Much has been written but little has been learned about the "common cold". A recent study[1] of several groups of school children has brought to light some hitherto unsuspected relationships between the "common cold" and communicable disease. It was found that, following exposure to such diseases as scarlet fever, measles and chickenpox, there would be a sharp peak of upper respiratory symptoms among these children, occurring near the end of the respective incubation periods. In one class of 37 pupils 11 children were absent with colds following exposure of the class to a mild case of scarlet fever the previous week. The rest of the classes in this school were having excellent attendance with very few colds.

The evidence put forward suggests that the etiologic agents of various communicable diseases may manifest their presence more frequently than is recognized by symptoms usually thought of as those of the common cold. There is nothing strange in this idea, as it has long been recognized that there are a large number of abortive and missed cases in all epidemics. Many so-called "colds" may in reality be missed cases of communicable diseases. If this should prove to be true, it should be possible to cut down the incidence of colds, by attention to fatigue and weather exposure following exposure to a communicable disease.

The fact that a virus has been indicated as the cause of the "common cold" does not eliminate other agents. All that has been demonstrated is that a certain virus can produce cold-like symptoms, and to consider it the only causative organism would be highly dangerous. The conception that upper respiratory infections may and probably do have a variety of causes has manifold hygienic and public health implications.

1. Turner, Naomi C.: Common Colds, New England J. Med. 222:184 (Feb. 1) 1940.

THE PLATFORM OF THE AMERICAN MEDICAL ASSOCIATION

1. The establishment of an agency of the federal government under which shall be coordinated and administered all medical and health functions of the federal government exclusive of those of the Army and Navy.

2. The allotment of such funds as the Congress may make available to any state in actual need, for the prevention of disease, the promotion of health and the care of the sick on proof of such need.

3. The principle that the care of the public health and the provision of medical service to the sick is primarily a local responsibility.

4. The development of a mechanism for meeting the needs of expansion of preventive medical services with local determination of needs and local control of administration.

5. The extension of medical care for the indigent and the medically indigent with local determination of needs and local control of administration.

6. In the extension of medical services to all the people, the utmost utilization of qualified medical and hospital facilities already established.

7. The continued development of the private practice of medicine, subject to such changes as may be necessary to maintain the quality of medical services and to increase their availability.

8. Expansion of public health and medical services consistent with the American system of democracy.

CASE REPORTS

DUKE HOSPITAL CLINICO-PATHOLOGICAL CONFERENCE

OCTOBER 18, 1939

Dr. Lamar Callaway (reading the clinical summary):

A forty-eight year old white man (Case A-25499) was admitted because of chills and fever during the preceding five months.

Family History: His paternal grandfather and great-grandfather both had heart trouble all their lives characterized by "double palpitations of the heart". They were both told that they had "leaking hearts."

Past History: His general health had always been good. He had influenza in 1919 and pneumonia in 1935. He had a Neisserian infection three years ago which resulted in urethral stricture requiring dilation every seven or eight weeks. The patient had noticed a thrill at the lower end of the sternum since early childhood, and at the age of eight years was told that he had a "leaking heart". The thrill and heart murmur had been noted frequently by physicians throughout his life, but he successfully passed three insurance examinations when he was twenty-four years of age.

Present Illness: Five months previously he had had a febrile illness, accompanied by cough and generalized muscular aches. He had a chill at the onset and another about one week later, and it was thought that he had malaria. The fever and chills persisted in spite of large doses of quinine. He had spent the month previous to admission in a nearby hospital, and while there was given three tablets of sulfapyridine three times daily for eight days. The chills ceased. Two weeks previous to admission he had experienced a sudden sharp pain in the lower right chest, associated with dyspnea and marked pain on deep inspiration. Three days later he coughed up bloody mucus. The pleuritic pain disappeared in a week. Ten days before admission he noted swelling of the feet, and several red, pin-point spots on the feet and ankles. He has lost about twenty pounds in weight.

Physical Examination: The temperature was 39.5°C., pulse 20, respiration 26. The blood pressure was 166/64 in both arms. The patient was fairly well developed and nourished and did not appear particularly ill. The respirations were a little rapid, but not difficult. Numerous petechiae were scattered over the feet and lower legs, and a few over the trunk and arms. Mucous membranes were pale. The teeth were very carious. Marked pyorrhea was present. Arterial pulsations were observed in the neck but there was no engorgement of neck veins. A thrill could be felt over the lower end of the sternum. The heart was moderately enlarged to the left. A loud, harsh, systolic murmur could be heard over the entire precordium and also over the posterior left chest, but best over the lower end of the sternum. Lungs were negative except for a few rales at both bases posteriorly. There was moderate abdominal distention but no shifting dullness, and no masses or organs could be felt. There was slight pitting edema over both feet and ankles; no clubbing of the fingers or cyanosis of the nail beds.

Accessory Clinical Findings: Hgb. 7.7 Gm. or 49 per cent; RBC 2,370,000; Color Index 1; WBC 11,680. Differential: PMN 95 per cent, of which 39 per cent were of the immature variety; LL 3 per cent; SL 1; M. 1; slight anisocytosis of the red blood cells. The sedimentation rate was 18 mm. per hour, corrected. Blood Wassermann and Kahn reactions were negative. Urine at the time of admission showed sp. gr. of 1.008, albumin 3 plus, and 20 RBC per high power field in the centrifuged sediment with a 4 plus benzidine reaction. The specific gravity of the urine throughout the hospital course was never above 1.012. Marked albuminuria persisted. At times there were as many as 200-300 RBC per high power field in the centrifuged urinary sediment. Stool examination was negative. NPN at the time of admission was 75 mg. per cent. Phenolsulfonphtalein test showed an excretion of only 22 per cent in two hours. Admission blood cultures yielded 15 colonies of alpha hemolytic streptococci (viridans) per cc. Electrocardiogram showed normal sinus rhythm with levogram predominant, and the conclusion was that the record did not indicate myocardial disease. Fluoroscopy and a film of the chest were reported as consistent with cardiac hypertrophy, a small congenital de-

fect explaining the long-standing cardiac signs.

Course in Hospital: The patient was given a soft diet supplemented by accessory vitamins, iron and liver. He was digitalized and fluids were restricted to 2,000 cc. each day. The edema persisted in spite of these measures, and a check on the plasma protein revealed a total protein of 5.4 gm. per cent with albumin of 2.3 gm. per cent and globulin of 3.1 gm. per cent, with an A/G ratio of .74. (Dr. Callaway, commenting: The blood protein was not particularly low. However, in the normal case we expect the total proteins to be about 6.8 gm. per cent.) He was given a total of 1,250 cc. of blood in four transfusions. Following the last transfusion the hematuria became more pronounced and he was given no blood during the nine last hospital days. The NPN continued to rise, and two days previous to death a pericardial friction rub could be heard. On the following day the NPN was found to be 150 mg. per cent. Three days before death he was given sulfapyridine intravenously. Immediately after the drug was administered the concentration was 41 mg. per cent and in eight hours had fallen to 3.6 mg. per cent. The drug was not given with the idea that it would be life-saving, but to see if the blood could be sterilized by a high concentration of the drug. On the following day, however, there were 60 colonies of alpha hemolytic streptococci per cc. of blood.

On the day before death, the plasma CO/2 combining power was 24 vol. per cent. In spite of intravenous molar lactate the CO/2 combining power was 28 vol. per cent on the day of death.

During the first ten hospital days the patient's temperature was seldom below 38°C. and on two occasions was above 40. He had one chill. During the last six days of his life the temperature only on two occasions was above 37. The WBC count varied from 6,000 to 17,000. At the time of death the Hgb. was 48 per cent.

On the sixteenth hospital day he complained of slight precordial pain and expired quietly a few minutes afterward.

DR. CALLAWAY: In summarizing, we have a forty-eight year old white man who apparently had been in good health until five months before admission. He gave a family history of cardiac disease. He himself had had a leaking heart since eight years of age and we must assume that he had had some heart disease. Until five months before admission he got along all right. The findings probably indicate subacute endocarditis superimposed on a previously damaged heart. As we know, 5 per cent of patients with congenital heart disease develop subacute bacterial endocarditis. Eighty per cent of cases of subacute bacterial endocarditis show rheumatic heart disease.

This man's illness began about five months before admission with chills and fever. Following that there was pain in the chest which was probably pulmonary infarction. There were petechiae on the extremities probably due to emboli. The patient also developed nephritis; the NPN went up considerably and there was uremia. Again I interpret this as an embolic phenomenon. Looking at the chest plate we see that he does not have a great deal of left sided cardiac enlargement. A patent interventricular septum is believed to be present because of: (1) a history of leaking heart and heart disease since early childhood, (2) superimposed subacute bacterial endocarditis with petechiae, emboli, etc., (3) physical signs showing globular heart, systolic thrill and a harsh loud systolic murmur heard best at left lower border of sternum, (4) x-ray and fluoroscopic evidence consistent with patent septal defect. He did not respond to molar lactate probably because of a failing circulation. For the anatomical diagnosis we assume that the patient had: Congenital heart disease; patent interventricular septum; subacute bacterial endocarditis; old pulmonary infarct; glomerulonephritis; cardiac hypertrophy; pericarditis (uremic?, embolic?). He may have had some other valvular lesions. Not having seen the patient, I cannot diagnose anything from the notes I have except patent interventricular septum. He probably showed an old pulmonary infarct.

DR. ROGER BAKER: May we see the x-rays?

DR. WILLIAM WALLACE: First of all the lung at the right base shows a line of thickening at the lower border between the upper and middle lobes. This is the only evidence of previous pulmonary infarct. He did experience pain at the time of infarction in the right base. As for the heart, it is slightly enlarged. It is not markedly globular, but the tip of the apex is rounded. My first im-

pression was that of mitral disease. We repeated the examination by fluoroscopy and gave him barium, and made a differentiation in favor of ventricular septum defect because the left auricle was not enlarged posteriorly and did not encroach upon the esophagus.

DR. BAKER: Would any one like to go further and place the lesion on one side of the heart or the other?

DR. DICK: The fact that embolic phenomena were noted in the form of a pulmonary infarct suggests that the lesion was on the right side of the heart.

DR. BAKER: Which way would blood circulate through a septal defect?

DR. CALLAWAY: From left to right, because of the greater pressure in the left side.

DR. BAKER: If that is so the lesion could be on the left side and an embolus to the lung could come from the left side of the heart, pass through the septal defect and through the right side of the heart to the lung. However, during diastole, the blood could pass in either direction through the patent septum.

Dr. Baker (demonstrating organs): The heart has a vegetation 2 cm. in diameter on the infundibular cusp of the tricuspid valve (Fig. 1). The valve leaflet has been eroded and is ruptured. The interventricular defect is in the upper part of the ventricular septum, in the fibrous portion, and is as large as a lead pencil—that is, a little less than 1 cm. in diameter. The vegetation extends as a prong from the tricuspid valve through the septal defect and presents in the chamber of the left ventricle (Fig. 2). Very interestingly, this prong is not attached to the walls of the defect itself, but lies free in the opening. It seems then that the original growth was on the tricuspid valve at a point where blood passing through the defect would impinge on the valve. The vegetation on the tricuspid valve has formed implants on that wall of the right ventricle away from the septum, and here chordae tendineae have been severed by erosion. This accident, coupled with the perforation of the valve leaflet, caused insufficiency of the tricuspid valve. This is to be correlated with the dilatation of the right side of the heart.

The pulmonary and aortic valves appear normal.

At the base of the right lung is an infarct. It is both white and yellow. The yellowness

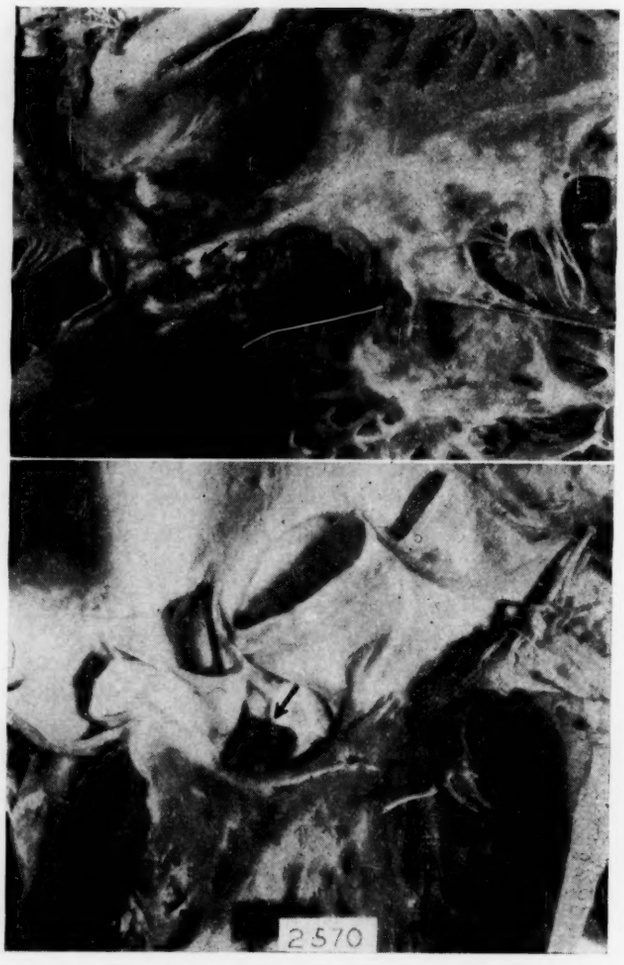

Fig. 1. Vegetation (V) and ulceration of tricuspid valve leaflet. Interventricular defect (arrow) to left. Note stump (s) of attachment of chordae tendineae and mural vegetative involvement in right lower corner.

Fig. 2. Prong of vegetation (arrow) extending through the interventricular defect into the left ventricle. Aortic valve and aorta above. Chamber of left ventricle below.

is probably due to hemosiderin, which would take some time to form. The clinical history indicates that the infarction occurred five weeks before death. The appearance of the infarct is consistent with that time interval. The lungs are heavy, due to congestion. The spleen is a typical acute splenic tumor. The kidneys are enormous—two or three times normal size — and studded with petechial hemorrhages. The liver presents marked chronic passive congestion.

A microscopic section (projecting sections on screen) of the tip of a portion of vegetation indicates that the latter is composed largely of Gram-positive cocci. There is a central necrotic area and a peripheral zone of fibrin and red cells. Sections of the kid-

neys show red cells in the tubules. These foci correspond to the petechiae noted on the surfaces of the kidneys and to the finding of red cells in the urine during life. In the glomeruli are thrombosed capillaries. The capsules show "crescent" formation on occasion, but these are all of recent origin. No glomerular or arteriolar changes indicative of kidney disease antedating the streptococcus septicemia are seen. The cardiac hypertrophy is therefore not to be associated with pre-existent renal disease. It is impossible for me to say which of the following factors was chiefly responsible for the cardiac hypertrophy: (1) hypertension (which was present, with high pulse pressure), (2) patency of interventricular septum, (3) tricuspid insufficiency, or (4) the recent renal damage.

Anatomical Diagnosis

(No. 2570)

Congenital heart disease; patent interventricular septum.

Cardiac hypertrophy (450 grams).

Subacute bacterial ulcerative endocarditis (streptococcus viridans) of tricuspid valve with remarkable projection of prong of vegetation through septal defect; implants of vegetation on mural endocardium with erosion of chordae tendineae.

Infarct of right lung with adjacent pleural adhesions.

Tricuspid insufficiency.

Chronic passive congestion of viscera. Pulmonary and subcutaneous edema. Ascites. Hydrocele.

Streptococcus viridans septicemia with hemorrhagic glomerulonephritis. Uremia. Fibrinous pericarditis. Acute splenic tumor. Focal necroses and ulcerations of intestinal mucosa.

Mild benign adenomatous prostatic hypertrophy.

DR. BAKER: The interest in this case lies in the fact that there was a congenital anomaly in relation to which bacterial endocarditis developed. It is suggested that the location of the vegetation is at a point at which a stream of blood would impinge when it passed through the abnormal opening in the septum. Such forceful continuous contact of the stream of blood may be the essential reason why the bacterial growth has developed at just this site. The manner in which the growth extends through the opening also suggests that blood must have passed not only from left to right as one would expect but also from right to left, perhaps during diastole.

Reference to the literature (Maude Abbott, 1925)[1] reveals the following interesting conclusion as the result of the study of a series of cases similar to the present one:

"In septal defects and patent ductus . . . . the (bacterial) lesion is usually right-sided and gives unmistakable evidence, both by this fact and by the presence of infarcts in the pulmonary circulation and absence of those on the systemic side, that the shunt in these abnormal communications is arterial-venous under the ordinary conditions of the circulation in health."

Here is an autopsy specimen from another case in which bacterial growth occurred on the pulmonary artery at the opening of a patent ductus. No growth occurred on the aorta at the other end of the patent ductus. This is in keeping with the observations of Abbott.

Therefore, when bacterial endocarditis develops in cases of congenital defect of the interventricular septum, the vegetations will probably develop on the right side primarily and involve the tricuspid valve.

1. Abbott, M.: Inflammatory Processes in Cardiovascular Defects, Ann. Clin. Med. 4:189, 1925.

CLINICO-PATHOLOGICAL CONFERENCE

CITY MEMORIAL HOSPITAL

WINSTON-SALEM

Mr. R. A. M., a white male fifty-nine years of age who had been living as a tramp, entered the hospital May 4, 1939, with swelling of the legs, pain in the left leg, and chills. The patient's family history was negative. The only important past history obtained was that of gonorrhea and syphilis twenty-thirty years ago treated by seventeen "shots" in the arm, and gall bladder disease fifteen years ago. Recently he had had moderate anorexia associated with a desire to vomit. The present illness began about twelve days before admission, with swelling of the ankles, which gradually extended up the legs. Three days before admission he began to have pain in the region of the left knee, which had become increasingly tender. The next day, while walking on the road, he became exhausted and spent the night in the woods sleeping by a camp fire. He had three

chills during the night. His diet had been limited almost entirely to eggs, milk, rice and cereal with very little green vegetables and fruit. He appeared anxious and showed evidence of having lived under poor hygienic conditions. The sclera were icteric, the pupils were round and equal, and reacted to light and accommodation. The tongue was coated, the breath foul, the teeth in poor condition, and the pharynx reddened. The lungs were normal. The heart was enlarged to the left. The apex impulse was palpable in the anterior axillary line in the fifth intercostal space. The heart sounds were distant with a soft systolic blow over the mitral area. The second heart sound was slurred. No thrill was palpable. The rate was 84 with regular rhythm, and the blood pressure was 120/70. The peripheral vessels were thickened but not sclerotic. There was generalized edema of the abdomen, especially marked in the sacral region. The liver was palpable at the costal margin. The spleen was not palpable. Free fluid was present in the abdominal cavity. Both legs were edematous and the left leg was red and tender with a small bleb present above the knee. Pulsation was present in the dorsalis pedis vessels and the femoral vessels. The genitalia were edematous. No abnormal neurological signs were present. The temperature on admission was 98.6°; pulse, 84; and the respiration, 20.

Laboratory Work:

Urine: Negative except for 15 to 20 W. B. C. Bile present. S. G. 1.023.

Blood:

R.B.C.	3,300,000	Hb. 12 grams
W.B.C.	13,150	
Stabs	23%	
Segs	60%	
Lymphs	9%	
Monos	7%	

Kline: Doubtful.
Stools: Negative for parasites, ova and blood.
Van den Bergh: Direct reaction, positive.
Icterus Index: 10
N. P. N.: 40
Sugar: 102
Smear from blister fluid on leg showed staphylococcus.
Blood albumin: 3.27 grams.
Globulin: 1.48 grams.
Blood culture: Negative in 48 hours.

X-ray examination of the chest on May 6 showed congestion of the pulmonary vessels in both bases, more marked on the right. There were adhesions between the pleura and the pericardium and a slight amount of fluid in the costophrenic angle. The cardiac outline was not enlarged, but the contour of the left ventricle was concave. During the patient's stay the temperature rose to 101.5° on alternate days for the first eight days. This was thought to be due to lymphangitis of the left leg, and the patient was given sulfanilamide. After the eighth day the temperature remained normal. By May 12 the patient had developed fluid in the right base and pulmonary edema. The heart sounds at this time were of poor quality. The heart rate was 70 with digitalis. The patient showed a gradual downhill course. The pulse ranged from 80-100. During the last twelve hours of life the pulse rate increased steadily from 108-146. The temperature at the same time rose from 96°F. to 102.6°F, and the respirations increased from 24-42. Just before death the patient regurgitated a large amount of dark brown blood. blood.

Clinical Discussion: (Dr. R. L. McMillan): This case presents several points of interest in differential diagnosis. The problem is complicated by several factors. In the first place, the history does not seem adequate, as the patient apparently was a poor witness.

The history shows a primary complaint of progressive swellings of the feet and legs, and yet there was no dyspnea, orthopnea, palpitation or other symptom of congestive heart failure. Furthermore, we have the roentgenologist's assurance that the heart was not enlarged. One must therefore conclude that this man's final illness was not heart failure, except as a very late terminal affair.

The history of pain in the left knee, and finding the left leg hot, red, swollen, and tender indicates either cellulitis or thrombophlebitis.

The large amount of abdominal ascites, history of some liver disease fifteen years ago, icteric index of 10, anorexia, nausea, and finally hematemesis, lead to the diagnosis of cirrhosis of the liver.

There was likely a terminal pneumonia and some heart failure with pulmonary edema in the end.

In summary then, it seems likely that this patient had cirrhosis of the liver, cellulitis of the leg, generalized arteriosclerosis, multiple vitamin deficiency, and terminal pneumonia.

Autopsy: The peritoneal cavity contained

over two liters of cloudy, red fluid. The right pleural cavity contained one liter of cloudy, straw-colored fluid, and the left pleural cavity contained 300 cc. The liver weighed 1,000 grams and was typical of Laennec's cirrhosis. The stomach and small intestines were distended with black semi-liquid blood and blood clots. The esophageal veins were dilated and one of them was ruptured. The left lung was soft and hemorrhagic and the bronchi contained black, semi-liquid material indicating aspiration of gastric contents. The mitral leaflets showed healed endocarditis probably rheumatic in origin. There was no evidence of coronary disease.

BULLETIN BOARD

State Board of Health

Dr. R. B. Aiken, industrial hygiene physician for the Vermont State Board of Health, made a tour of the state with Dr. T. F. Vestal, Director of the North Carolina Division of Industrial Hygiene.

They visited foundries, granite works, woolen mills, knitting and pulp mills. Practically all these industries exist in Vermont, Dr. Aiken explained, and added: "It was suggested by the National Division of Industrial Hygiene that I come to North Carolina in order to see practical demonstrations of just how these occupational problems are being handled from both a medical and an engineering standpoint."

Nutritional Study

North Carolina, through the medium of its State Board of Health, in cooperation with other important agencies, is preparing to take an advanced step in the field of nutrition.

The General Committee on Nutrition met at the call of Dr. Carl V. Reynolds, State Health Officer, in the new State Laboratory of Hygiene building, and discussed plans for the improvement of the nutritional status of the people of North Carolina. As a first step, it was determined to launch a state-wide fact-finding program, to be carried on through the various agencies represented.

Cooperating Agencies

The committee, organized on a state-wide basis, is composed of the following members from the participating agencies:

Department of Public Instruction: Charles E. Spencer, representing Superintendent Clyde A. Erwin; Miss Virginia Ward.

Duke University School of Medicine: Dr. W. C. Davison, dean; Dr. William A. Perlzweig; Dr. G. S. Eadie; Dr. W. J. Dann.

Rockefeller Foundation: Dr. John A. Ferrell, Dr. John F. Kendrick, Dr. D. F. Milam.

Department of Public Welfare: Mrs. W. T. Bost, commissioner; Dr. James Watson, head of the Division of Mental Hygiene.

Department of Agriculture: Dr. E. C. Constable, representing Commissioner W. Kerr Scott; Dr. C. W. Pegram.

Extension Division, State College: Dean I. O. Schaub, Dr. John W. Goodman.

North Carolina Medical Society: Dr. Cloyce R. Tew, representing Dr. T. W. M. Long.

North Carolina College for Women: Miss Margaret Edwards.

University of North Carolina, Division of Public Health: Dr. H. W. Brown.

State Board of Health: Dr. G. M. Cooper, Dr. E. S. Lupton, Dr. J. C. Knox, Dr. R. E. Fox, Dr. Walter Wilkins.

General Purposes

Dr. Reynolds, who called the conference and presided, explained its purposes and outlined plans for a cooperative nutritional study.

The purpose of the study, which is being set up in cooperation with the Duke University Medical School, "is to get an accurate measure of the present nutritional status of selected areas and groups of the population," Dr. Reynolds explained. The first studies, including blood tests of patients, will be conducted in an area within thirty miles of Durham.

The state-wide nutrition committee will supervise the study and later formulate a practical program for improving the nutritional status of the whole population.

New Building for State Laboratory of Hygiene

On February 21 the Clarence Albert Shore Memorial building of the State Laboratory of Hygiene was formally dedicated. Among the speakers in the three-hour ceremony were Governor Hoey, who paid tribute to Dr. Shore and to other pioneers in North Carolina's public health program, and Dr. John A. Ferrell, associate director of the International Health Division of the Rockefeller Foundation, who was associated with Dr. Shore in the early days of the laboratory. Dr. Ferrell, speaking of the new $200,000 building and a $180,000 farm laboratory nearing completion, said: "This excellent laboratory set-up is only approximated by Georgia in the states of the South."

Following the speeches of the morning, Governor Hoey participated in the unveiling of a memorial tablet for Dr. Shore.

News Notes from Duke University School of Medicine and Duke Hospital

The following clinics have been held recently:

January 26, "Testosterone Therapy in Hypogenitalism", by Dr. Samuel A. Vest, Jr., Professor of Urology, University of Virginia Medical School.

February 27, "Appendicitis", by Dr. John M. T. Finney, Jr., Associate in Surgery, The Johns Hopkins University School of Medicine.

February 28, "Influenza", by Dr. Thomas Francis, Jr., Professor of Bacteriology, Bellevue Medical School.

Through the grant of $175,000 from The Rockefeller Foundation, a department of Psychiatry and Mental Hygiene has been established at Duke University, to be operated beginning September 1, 1940. The Highland Hospital, at Asheville, N. C., a gift to the University last year by Dr. Robert S. Carroll, will be used in connection with this department. Dr. Richard S. Lyman, now of the Phipps Psychiatric Clinic, The Johns Hopkins University, has been appointed head of the new department.

News Notes from the School of Medicine of the University of North Carolina

Sponsored by the School of Medicine and the Extension Division of the University of North Carolina, the Third Post Graduate Course in Medicine at Charlotte began on Tuesday, February 6. Following is the program for the entire course:

February 6—"Problems Presented by the Symptom Jaundice"—Dr. A. M. Snell, Mayo Clinic, Rochester, Minnesota.

February 13—"The Diagnosis and Treatment of Vitamin Deficiencies in Man"—Dr. Tom Spies, Professor of Medicine, and Director of Research Nutrition, University of Cincinnati College of Medicine, Cincinnati, Ohio.

February 20—"Meniere's Disease and Other Vertigoes: Cranial Neuralgias and Other Diseases and Lesions of the Cranial Nerves"—Dr. Walter E. Dandy, Professor of Neurology, Johns Hopkins Medical School, Baltimore, Md.

March 5—"The Diagnosis and Treatment of Syphilis"—Dr. Udo J. Wile, Professor of Dermatology and Syphilology, University of Michigan, Ann Arbor, Mich.

March 12—"Thyroid and Other Endocrine Disorders"—Dr. J. H. Means, Jackson Professor of Clinical Medicine, Harvard University School of Medicine, Boston, Mass.

March 19—"Management of the Menopause"—Dr. Emil Novak, Professor of Gynecology, Johns Hopkins School of Medicine, Baltimore, Md.

Clinics are held at 4:30 p. m., followed by dinner at 7:00 p. m., and a lecture at 8:00 p. m.

Post-graduate courses will begin in Raleigh on March 15 and in Goldsboro on March 16.

News Notes from the Wake Forest Medical School

Dr. C. C. Carpenter, Dean of the Medical School, attended the Annual Congress on Medical Education held in Chicago on February 12 and 13. Dr. Carpenter remained in Chicago for conferences with various medical educators, officials of the American Medical Association, and Deans of other leading schools, on the facilities and educational program of the school as it will be when moved to Winston-Salem and expanded to a four year institution. All consulted were enthusiastic in their praise. A great majority of the items on which a medical school is rated placed the School in the upper ten per cent, when compared with existing four year schools.

The Medical School sponsored a Student Convocation for all departments of the college on January 8. Dr. Herbert S. Wells, Associate Professor of Physiology at Vanderbilt University School of Medicine, was the guest speaker. His subject was, "The Physiology of Living".

Dr. Robert P. Morehead, Assistant Professor of Pathology, was guest speaker at the Second District meeting of the South Carolina Medical Society held at Batesburg on February 1, 1940. His subject was, "Appendicitis—A Clinical and Pathological Study of 5,644 Cases".

Dr. Camillo Artom, Professor of Biochemistry, was recently selected, along with Dr. L. Emmett Holt, Jr., of Johns Hopkins and Dr. W. R. Bloor, of the University of Rochester, by the Carolene Products Co. to make a special study of fat metabolism.

North Carolina Mental Hygiene Society

The Fourth Annual Meeting of the North Carolina Mental Hygiene Society was held at the Washington Duke Hotel in Durham on February 16, with Dr. W. R. Stanford presiding. The general topic for the afternoon program, which began at 2:30 o'clock, was Mental Hygiene of the Child. The speakers for this meeting were W. D. Perry, Ph.D., Director of the University Testing Service, and Adviser for the General College, University of North Carolina, whose subject was "The Child in the School"; Richard F. Richie, M.D., Assistant Director, Division of Mental Hygiene, State Board of Charities and Public Welfare, who spoke on "The Child in the Community"; and Frank Howard Richardson, M.D., of Black Mountain, who spoke on "The Child in the Home". A business meeting was held at 4:30 o'clock, and an informal dinner at 7:00 o'clock. The guest speaker at the evening meeting was Dr. C. C. Burlingame, Psychiatrist-in-Chief of the Neuro-Psychiatric Institute of the Hartford Retreat, Hartford, Connecticut, whose topic was "Youth and Middle Age—Neglected Ages of Man".

Tri-State Medical Association

The Forty-Second Annual Meeting of the Tri-State Medical Association of the Carolinas and Virginia was held at the John Marshall Hotel in Richmond on February 26 and 27. Among the speakers were Dr. Graham Reid of Charlotte, who spoke on "Intubation of the Small Intestine as It is Related to Intestinal Obstruction"; Dr. G. Carlyle Cooke of Winston-Salem, who discussed "Some Chemical Problems Confronting the Surgeon"; Dr. R. B. Davis of Greensboro, who gave a paper on "The Differential Diagnosis Between Chronic Appendicitis and Chronic Disease Conditions of the Right Ureter"; Dr. W. S. Cornell of Charlotte, whose subject was "The Selection of Patients with Gallbladder Disease for Surgery"; Dr. Deryl Hart of Durham, who spoke on "Sterilizing the Air in the Operating Room with Bactericidal Radiation"; Dr. Jack Mickley of Tabor City, who gave a paper on the "Treatment of Venereal Ulcers in General Practice"; and Dr. R. S. Anderson of Rocky Mount, who gave an illustrated lecture on "Four Problems Concerning Adenomatous Goiter". Guest speakers were Dr. Charles F. Geschickter of Baltimore, who gave an address on "Some Phases of the Cancer Problem"; Dr. A. C. Broders of Rochester, whose subject was "Cancer as We Know It Today"; Dr. Temple Fay of Philadelphia, who gave an address on "Refrigeration in Cancer"; Dr. Seale Harris of Birmingham, who addressed the Association on "The Diagnosis and Dietary Management of Hyperinsulinism"; Dr. Maurice Protas of Washington, who spoke on "The Insulins and Their Uses"; Dr. Emil Novak of Baltimore, whose address was on "The Treatment of Primary Dysmenorrhea"; and Dr. Lawrence F. Woolley of Towson, Md., who gave an address on "Morbid Fear and Anxiety as a Cause of Physico-Pathological Changes in Structure".

Dr. C. J. Andrews of Norfolk is president of the Association for the coming year, and Dr. A. G. Brenizer of Charlotte was named president-elect. Dr. R. B. Davis of Greensboro, Dr. J. B. Davis, Jr., of Lynchburg, and Dr. G. R. Wilkinson of Greenville, S. C., were elected vice-presidents. Elected to fill vacancies on the council were Dr. J. R. Young of Anderson, S. C., Dr. R. P. Morehead of Wake Forest, and Dr. O. B. Darden of Richmond.

The American College of Physicians

The Twenty-Fourth Annual Session of the American College of Physicians will be held in Cleveland, Ohio, April 1-5, 1940. General headquarters for the meeting will be in the Public Auditorium.

American Board of Internal Medicine, Inc.

The American Board of Internal Medicine will conduct oral examinations just previous to the meeting of the American College of Physicians in Cleveland and just in advance of the meeting of the American Medical Association in New York City.

Applicants who have successfully passed the written examination and plan to take the oral examination in 1940, should advise the office of the Secretary at least six weeks in advance of the date of the examination they desire to take.

The next written examination for 1940 will be given on October 21. Applications for this examination must be filed in the Secretary's office by September 1.

Application forms may be obtained from Dr. William S. Middleton, Secretary-Treasurer, 1301 University Avenue, Madison, Wisconsin, U. S. A.

Second Call for the Decennial Meeting of the Convention for the Revision of the Pharmacopoeia of the United States of America

In compliance with the provisions of the Constitution and By-Laws of the United States Pharmacopoeial Convention, I hereby issue this second call to the several bodies entitled under the Constitution to representation therein to appoint three delegates and three alternates to the Decennial Meeting of the Convention for the Revision of the Pharmacopoeia of the United States of America, which is to meet in Washington, D. C., on May 14, 1940.

WALTER A. BASTEDO, M. D.,
President of the United States
Pharmacopoeial Convention.

Notice—In order that the records may be brought up-to-date and checked, that card files may be prepared, and that the other functions of the Committee on Credentials may be performed, it is desirable that the Credentials of all Delegates appointed to attend this Decennial Meeting shall be in the hands of the Secretary, Mr. L. E. Warren, 2 Raymond St., Chevy Chase, Maryland, not later than March 15, 1940.

Educational Qualifications of Health Officers

The American Public Health Association has recently adopted for distribution a report on the "Educational Qualifications of Health Officers", in the belief that it will serve a useful purpose in raising the educational standards of professional public health personnel. Copies may be secured without cost from the American Public Health Association, 50 West 50th Street, New York, N. Y.

Buncombe County Medical Society

At its first February meeting, held at the City Hall on February 5, the Buncombe County Medical Society heard the program which was scheduled for January 22 but was postponed because of a conflict. Dr. R. C. Bunts presented a paper on "Congenital Obstruction of the Bladder Neck", which was discussed by Dr. W. C. Lott. On February 19 Dr. C. N. Burton gave a paper on "Panhysterectomy", with Dr. Julian A. Moore as respondent.

Forsyth County Medical Society

The February meeting of the Forsyth County Medical Society was held at the Smokehouse in Winston-Salem, on February 20 at 7 o'clock. The Guest Speaker was Dr. Howard Holt Bradshaw, Associate Professor of Surgery at the Jefferson Medical College, Philadelphia. Dr. Bradshaw, who has done a most impressive amount of Thoracic Surgery and is one of the outstanding men in that line in the country, spoke on "The Surgical Treatment of Bronchiectasis". His lecture was illustrated by lantern slides and motion pictures. A number of visitors from Stokes, Surry, Yadkin, and Guilford counties were present.

Guilford County Medical Society

The Guilford County Medical Society met on February 1 at the Jefferson Roof Garden in Greensboro. Guest speakers were Dr. T. W. M. Long, whose subject was "Insurance as Offered to the Public", and Dr. Arthur Ambler, of Asheville, who spoke on "The Present Status of Anesthesia".

Halifax County Medical Society

The Halifax County Medical Society held its regular meeting on Friday night, February 9, at 7:00 o'clock at the Roanoke Rapids Hospital, with Dr. White, president of the society, presiding.

Dr. C. T. Smith, of Rocky Mount, presented a paper on "Diabetes and Diabetic Coma", in which the salient symptoms and the modern advances in treatment were discussed.

Johnston County Medical Society

The Johnston County Medical Society met in Benson on January 30 for a supper meeting. Drs. McBride and Persons, of Duke University, gave a talk on "The Uses and Misuses of Sulfanilamide and Sulfapyridine", and Dr. K. L. Johnson, a dentist, showed moving pictures in technicolor of the extraction of impacted teeth by using an instrument to break them before removal.

News Notes

Dr. J. E. McLaughlin, formerly of Statesville, an honorary fellow of the Medical Society of the State of North Carolina and of the Iredell-Alexander Medical Society, is now living with his son-in-law and daughter, Dr. and Mrs. J. S. Talley, in Troutman. Dr. McLaughlin retired from active practice in 1937 because of failing eyesight, after having practiced for fifty-one years.

WOMAN'S AUXILIARY

Officers

President: Mrs. C. F. Strosnider, Goldsboro.
President-Elect: Mrs. C. R. Hedrick, Lenoir.
Chairman of Past Presidents: Mrs. P. P. McCain, Sanatorium.
Corresponding Secretary: Mrs. Jack Harrell, Goldsboro.
Recording Secretary: Mrs. J. D. Freeman, Wilmington.
Treasurer: Mrs. C. E. Judd, Raleigh.

BEGINNING OF THE WOMAN'S AUXILIARY

The Auxiliary to the Medical Society of the State of North Carolina has grown so rapidly and the membership has varied so greatly in the seventeen years of its existence that we felt it might be interesting to write a little about our beginnings and of those foundations upon which we have built.

The seventieth annual session of the Medical Society of the State of North Carolina was held in Asheville in April, 1923, with Dr. John Wesley Long presiding. In his President's Address, Dr. Long announced the birth of our Auxiliary on Sunday, March 17, 1923, at Sanatorium. The Auxiliary was the brain child of Mrs. P. P. McCain. Daughter of a doctor and wife of a doctor, Sadie McBrayer McCain could not remember when she first attended an annual meeting of the State Medical Society. She had caught the vision of a group of wives and daughters who would meet together in an effort to "promote unity, harmony and concord between the members of the medical profession and between the families of such members; to assist in the social activities at state, district and county society meetings; to interpret to the public the traditions, aims and objects of the medical profession; to fraternize with women's organizations of whatsoever kind, and to promote in every possible way the interests in general of the medical profession—locally, and in the State and Nation." (See Constitution and By-Laws in the 1923 TRANSACTIONS OF THE MEDICAL SOCIETY OF THE STATE OF NORTH CAROLINA.) Mrs. McCain's father, Dr. L. B. McBrayer, was secretary-treasurer of the Medical Society and deeply interested in his daughter's vision. Up to the day of his death Dr. McBrayer maintained his interest in the Auxiliary and its activities. He considered it an integral part of the Medical Society. Our program was always incorporated in the program of the Medical Society. Our membership list and proceedings always had a place in the TRANSACTIONS. Dilatory presidents were gently and courteously prodded until the material was in. The Auxiliary is deeply indebted to Dr. McBrayer for his kindly consideration and his understanding friendship through many years. We feel that a great part of the credit for the formation of our Auxiliary belongs to Dr. McBrayer—that it was through his interest that Dr. Long became interested and took the journey to Sanatorium to discuss it with Mrs. McCain.

In Dr. Long's President's Address full credit was given to Mrs. McCain, and responsibility for the "proper raising and education" of the baby auxiliary was placed upon her shoulders. He asked that the Society "acknowledge paternity and give its approval by resolution in the House of Delegates." This was done.

On April 18, 1923, the Auxiliary was formally organized—or christened, as Dr. Long expressed it—at a meeting in Kenilworth Inn, Biltmore, with Mrs. McCain acting as organizing chairman. Dr. Long and Dr. McBrayer attended the meeting and gave it official sanction. Mrs. C. S. Red, of Houston, Texas, President of the Auxiliary to the American Medical Association, was also present and gave a brief history and account of the work of the Auxiliary. Mrs. McCain was elected president and Mrs. I. W. Faison, of Charlotte, President-Elect. There were fifty-three wives of doctors present.

In our article next month we shall attempt to tell something of our projects and of how well we have kept the faith with the Medical Society.

MRS. J. BUREN SIDBURY, Chairman
Public Relations, Auxiliary to the Medical Society of the State of North Carolina.

AN EXAMINATION FOR MEMBERS OF THE AUXILIARY TO THE MEDICAL SOCIETY OF THE STATE OF NORTH CAROLINA

Questions complied by Mrs. C. F. Strosnider.

Answers compiled by Mrs. P. P. McCain.
Financial statements verified by Mrs. E. C. Judd.

Request: Will each Auxiliary member please study these questions and answers? —Anna L. Strosnider, President.

1. When was the Auxiliary formed? April 18, 1923.
   A. Where? Asheville. How many members? Fifty-three.
   B. Tell all you know about this meeting. On March 17, 1923, Dr. John Wesley Long, then president of the Medical Society of the State of North Carolina, went to Sanatorium to talk over with Mrs. P. P. McCain the organization of an Auxiliary to the State Medical Society. As a result of this conference Mrs. C. S. Red, president of the Auxiliary to the American Medical Association, was present at the annual meeting in Asheville. The Auxiliary was formally organized at this meeting, April 18, 1923, by Mrs. C. S. Red and a Constitution and By-Laws were adopted. Reference — TRANSACTIONS OF THE MEDICAL SOCIETY OF THE STATE OF NORTH CAROLINA, 1923, pp. 466-467.
2. Has the Auxiliary gained in members? Yes, from 53 in 1923 to 423 in 1938.
3. What are the offices in the Auxiliary? President, three vice presidents, recording and corresponding secretaries, and treasurer.
   A. Who are the 1939-40 officers? See official stationery for 1939-40.
   B. Name the past presidents of the Auxiliary.
      1923—Mrs. P. P. McCain, organization president
      1924—Mrs. P. P. McCain, Sanatorium
      1925—Mrs. I. W. Faison, Charlotte
      1926—Mrs. J. Howell Way, Waynesville
      1927—Mrs. R. S. McGeachy, Kinston
      1928—Mrs. J. B. Lawrence, Raleigh
      1929—Mrs. A. B. Holmes, Fairmont
      1930—Mrs. J. H. Macon, Warrenton
      1931—Mrs. W. B. Murphy, Snow Hill
      1932—Mrs. R. S. McGeachy, Greenville
      1933—Mrs. W. P. Knight, Greensboro
      1934—Mrs. J. W. Huston, Asheville
      1935—Mrs. J. B. Sidbury, Wilmington
      1936—Mrs. C. P. Eldridge, Raleigh
      1937—Mrs. J. R. Terry, Lexington
      1938—Mrs. W. T. Rainey, Fayetteville
      1939—Mrs. J. A. Elliott, Charlotte
      1940—Mrs. C. F. Strosnider, Goldsboro.
4. What are the duties of each officer? Those given by Roberts Rules of Order.

   What are the objectives of the Auxiliary? Reference—TRANSACTIONS, 1938, p. 635. Art. II. Sec. 1.

   Section 1. Objects . . . "The objects of this organization shall be to interpret the aims of the medical profession to other organizatons interested in the promotion of health education: To assist in the entertainment at the meetings of the Medical Society of the State of North Carolina; to promote friendliness among the families of the medical profession; and to do such work as may be approved from time to time by the Advisory Committee appointed by the Medical Society of the State of North Carolina."
   A. What is the relationship of the State Auxiliary to the National Auxiliary? We are affiliated with the National Auxiliary, cooperating with it in its programs and objectives, and paying twenty-five cents for each member of an organized Auxiliary. In return we get many valuable suggestions and pamphlets, and much practical information.
5. How do we become members of the Southern Medical Auxiliary?

A doctor's membership in the Southern Medical Association automatically makes his wife a member of the Auxiliary to the Southern Medical Association.

A. What officers and chairmen do we have specifically for the Southern Medical Auxiliary?
   (1) Councillor—appointed by president of the Southern Medical Auxiliary.
   (2) Jane Todd Crawford Memorial Chairmen.
   (3) Research Chairman.
   These chairmen have specific duties which can be learned from our information sheets.

B. What benefits do we derive from the Southern Medical Auxiliary?
Borrowing from their library and the privilege of attending their stimulating meetings.

6. History of McCain Bed.
   A. When undertaken? 1928, Mrs. R. S. McGeachy, president.
   Why? To have a definite objective for the Auxiliary.
   B. How much have we spent on the upkeep of the McCain bed?
   $4,851.36 has been paid the North Carolina Sanatorium up to April 1, 1939.
   C. Who has occupied the McCain bed and how long was each a guest of the bed?
      (1) Mary Odum (child) Red Springs—4½ months.
      (2) Eleanor Stevens (doctor's daughter) Monroe—6 months.
      (3) Daisy Andrews (child) Carrboro—12 months.
      (4) Miss Ardis Jester (nurse) Sanatorium—18 months.
      (5) Dr. J. S. Johnson (physician) Cary—11 months.
      (6) Sara Beam (girl) Bryson City—5 months.
      (7) Marie Lowe (girl) Asheboro—7 months.
      (8) Harry Stegall (boy) Oxford—5 months.
      (9) Bertie Teague (young lady) Marshall—4 months.
      (10) Mr. L. S. Sawyer (young man) Columbia—14 months.
   D. Give the history of the naming of the bed. Reference—TRANSACTIONS 1935, p. 453.
   E. What amount has the Auxiliary set as a goal to raise for the endowment of this bed? The amount of $10,000.
   F. How much of this amount has been raised to date? By April 1, 1939, $1,421.66 of this amount had been raised.

7. The Student Loan Fund.
   A. When was this organized and why? This fund was created in May, 1930, Mrs. W. B. Murphy, president, to help worthy and needy doctors' children in their junior and senior years at college or for special work.
   B. How many loans have been made and how many have benefited from same? Up to September, 1939, six loans were made to three different people.
   C. How much money do we have in this fund? The amount in the bank November, 1939, was $619.79.
   D. What is the goal set for this fund? The goal is $10,000.

8. What is the Jane Todd Crawford Memorial Fund? This fund to be used to erect a memorial to Jane Todd Crawford.
   A. Give the outstanding details of Jane Todd Crawford's life. Reference—TRANSACTIONS, year 1933, p. 522.

9. How much does the Auxiliary get from a *Hygeia* subscription? The Auxiliary gets $1.25 from each subscription.
   A. How does the Auxiliary use this money? This money is placed in the McCain Bed Endowment Fund.

10. What are the Auxiliary dues? $1.00.
   A. Tell how this dollar is used. 50 cents goes to McCain Bed upkeep; 25 cents to American Medical Auxiliary; 25 cents for the State Auxiliary expenses.

11. What is Doctor's Day? Doctor's Day is a project of the Southern Medical Auxiliary, inaugurated for the purpose of honoring our doctors, both living and dead.
   A. When? March 30.
   B. Why was this date chosen? This date was chosen because on this date anesthesia was first given to the

world. Reference — TRANSACTIONS, 1935, p. 453. Executive Board Meeting Minutes, number 5.

12. Why should every doctor's wife belong to the Auxiliary? (1) To meet and discuss medical problems that are pertinent to the doctor's wife; (2) To gain information for helping lay groups; (3) To learn to know other doctors' wives better.
13. How can we make the Auxiliary more interesting and useful to its members? Have something definite to offer in the way of a program—short, spicy, but informative—at every meeting; encourage newest and oldest wives to attend; etc.

NOTICES

Owing to illness Mrs. John C. Tayloe has had to resign as Councillor for the Second District. Mrs. Graham Ramsey, 320 College Avenue, Washington, has now assumed the duties of Councillor for the Second District.

ANNA L. STROSNIDER, Pres.

The 18th Annual Convention of the Woman's Auxiliary to the American Medical Association will be held in New York City, June 10-14, 1940, with headquarters in the Hotel Pennsylvania. In view of the fact that the second edition of the World's Fair will accelerate advance hotel reservations, it is urged that reservations be made immediately through the Housing Bureau which has been set up by the American Medical Association, namely Dr. Peter Irving, Room 1036, 233 Broadway, New York City.

Have you made your hotel reservation for the 18th Annual Convention of the Woman's Auxiliary to the American Medical Association which will be held in New York City, June 10 to 14, 1940?

The headquarters are at the Hotel Pennsylvania and we are sure you will not want to miss this convention which promises to be an outstanding one. MAIL YOUR RESERVATION TODAY to Dr. Peter Irving, Housing Bureau, Room 1036, 233 Broadway, New York City.

In Memoriam

DR. JAMES ARTHUR KEIGER

Dr. James Arthur Keiger of Greensboro, one of our outstanding and most beloved members, died Thursday morning, February 1, 1940. He had been in declining health for several months, and on January 31 underwent an operation for gall stones, hoping to regain his health at least in part, but his physical condition was so depleted that he was unable to rally from the shock of operation.

Dr. Keiger was born in Stokes County near King, a son of the late John W. Keiger and Mrs. Martha Schaub Keiger. After attending the public schools in Stokes County he was a student at Booneville high school, graduated from the University of North Carolina in 1909 with an A. B. degree, and then taught school in High Point for two years.

He later took up the study of medicine and graduated from the University of Virginia in 1914 with Phi Beta Kappa honors. He served his internship at Orange Memorial Hospital, Orange, N. J., and did post graduate work at Bellevue Hospital, New York. He was later commissioned as Captain in the U. S. Public Health Service and was stationed at Camp Greene, Charlotte, N. C., during the World War.

He came to Greensboro in 1920 and opened offices for the practice of his profession, specializing in diseases of the genito-urinary tract and dermatology; here he enjoyed a lucrative practice until his health so declined that he was forced to limit his time in his office and take needed rest in an effort to regain his health.

Dr. Keiger was a member and past president of this Society, a member of the State Society and of the American Medical Association.

Dr. Keiger was married to Miss Ethel Bollinger in 1922, and of this union one son, Jimmy, survives. Also surviving are his wife, four brothers, Charles E. Keiger of Statesville, M. F. Keiger of Tobaccoville, Dr. O. R. Keiger of Winston-Salem, and Dr. C. C. Keiger of Charlotte, and two sisters, Mrs. John Lee Wilson of Madison and Miss Blanche Keiger of Greensboro.

Funeral services were held for Dr. Keiger in the First Presbyterian Church of Greensboro, services being conducted by Dr. Charles Myers, assisted by Dr. J. B. Craven, pastor of West Market Street Methodist Church, and interment followed in Forest Lawn Cemetery. The funeral was attended by a large concourse of sorrowing friends and relatives.

Dr. Keiger, a quiet unassuming man, but well qualified in his special branch of medicine, was held in high esteem not only by his patrons but by all who had the privilege of knowing him, and I dare say that no member of this Society was more beloved by its members. He had no enemies, and his friends were limited only by the number of those who knew him. It is with a feeling of deep sorrow that we bow in humble submission to the Divine will in calling hence our beloved brother and co-worker, and we extend our sincere sympathy to his sorrowing family and friends.

C. W. Banner,
Chairman Obituary Committee
Guilford County Society.

BOOK REVIEWS

DISEASES OF THE GALLBLADDER AND BILE DUCTS. By Waltman Walters, B.S., M.D., M.S. in Surgery, Sc.D., F.A.C.S., Head of Section in Division of Surgery, The Mayo Clinic; Professor of Surgery, The Mayo Foundation (University of Minnesota); and Albert M. Snell, B.S., M.S. in Medicine, F.A.C.P., Head of Section in Division of Medicine, The Mayo Clinic; Professor of Medicine, The Mayo Foundation (University of Minnesota). 645 pages with 342 illustrations on 195 figures. Philadelphia and London: W. B. Saunders Company, 1940. Cloth $10.00.

It is difficult to conceive of a more comprehensive and intelligently detailed presentation of diseases of the gallbladder and bile ducts than is put forth in the monograph by Walters and Snell.

In this work the subjects are completely developed in a most interesting and orderly sequence from their early historical existence to our present day knowledge, covering most meticulously the anatomical, phsyiological and pathological aspects as well as the medical and surgical treatment.

One is impressed by the exhaustive study in compiling this treatise and the delightful style of presentation. It is a distinctly valuable contribution to medical literature.

ACCEPTED FOODS AND THEIR NUTRITIONAL SIGNIFICANCE, a publication of the Council on Foods of the American Medical Association. Cloth, Price, $2.00 postpaid. Pp. 512; Chicago: American Medical Association, 1939.

ACCEPTED FOODS AND THEIR NUTRITIONAL SIGNIFICANCE contains descriptions and detailed information regarding the chemical composition of more than 3,800 accepted products, together with a discussion of the nutritional significance of each class of foods. The book provides also the Council's opinion on many topics in nutrition, dietetics and the proper advertising of foods.

This book will be a welcome reference book for all persons interested in securing authoritative information about foods, especially the processed and fabricated foods which are widely advertised. The accepted products are classified in various categories; fats and oils; fruit juices including tomato juice; canned and dried fruit products; grain products; preparations used in the feeding of infants; meats, fish and sea foods; milk and milk products other than butter; foods for special dietetic purposes; sugars and syrups; vegetables and mushrooms; and unclassified and miscellaneous foods, including gelatin, iodized salt, coffee, tea, chocolates, cocoa, chocolate flavored beverage bases, flavoring extracts, dessert products, baking powder, cream of tartar, baking soda, cottonseed flour. There is a suitable subject index as well as an index of all the manufacturers and distributors of food products that stand accepted by the Council on Foods.

ACCEPTED FOODS is indispensable for the library of every physician concerned with foods and nutrition.

INJECTION TREATMENT OF HERNIA, HYDROCELE, GANGLION, HEMORRHOIDS, PROSTATE GLAND, ANGIOMA, VARICOCELE, VARICOSE VEINS, BURSAE AND JOINTS. By Penn Riddle, B.S., M.D., F.A.C.S., Assistant Professor of Clinical and Operative Surgery, Baylor University, College of Medicine; Director of the Varicose Vein Clinic, Parkland Hospital, Dallas, Texas. Cloth. Price, $5.50. Pp. 290, with 153 illustrations. Philadelphia and London: W. B. Saunders Company, 1940.

This is an excellent detailed and complete work on treatment by injections. The author covers in detail the essential anatomy of the part, gives a brief history of the development of injections, and describes the actual technique of injection.

He has evidently investigated the various types and methods of injections with an open mind, and clearly states what may be expected from each. Nowhere in his work does he claim any cure-all properties for any method.

The text is most explicit and detailed, so that one needs little information not included in the author's description to proceed with the various forms of injections. He is most particular to emphasize that in many instances repeated injections over a period of time are necessary to obtain desired results, giving the average length of time required.

Beautiful, clear illustrations are profusely scattered throughout the text, making it very easy for the novice to understand the procedures.

The work will be of help to any one practicing the injection treatment, and to one who is not familiar with the injection treatment but who wishes to learn it, it will be invaluable.

WHAT IT MEANS TO BE A DOCTOR. By Dwight Anderson. Price, cloth, $1.00; paper, 25 cents. Pp. 87. New York: Medical Society of the State of New York, 1939.

While Mr. Anderson is not himself a doctor, few writers have told more truly what it means to be a doctor of the highest type—loyal to his profession, to his ideals, and to his patients. In narrative form, a doctor is followed through college, medical school, internship, into private practice and into the inner circles of organized medicine. No doctor could read it without having greater respect for his profession; no layman, without greater admiration for his doctor.

The Dominating Impulse in the Study of Medicine.—To those who, as teachers, watch successive classes of medical students progress in their course of study it is always striking to see how each group responds with enthusiasm when, after a year or two of laboratory study, it reaches the stage where contact with patients begins. This is what they have been working toward and waiting for. Dissecting room, microscope, chemical experiment—these were but means to prepare them for the great end which is the human relationship between the physician and the patient. It is the desire for this human relationship, with its opportunity for sympathetic intimacy and altruistic service, that remains today, as it has been through all the generations, the dominating impulse in drawing men to the study of medicine.—Peabody, Francis W.: Doctor and Patient, New York, The Macmillan Company, 1939.